

Department of Science

COURSE OUTLINE – Fall 2026

CS2290 (UT): COMPUTER ORGANIZATION AND ARCHITECTURE I - 3 (3-0-3) 90 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: Franco Carlacci
OFFICE: C422
OFFICE HOURS: TBA

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CALENDAR DESCRIPTION: General introduction to number representation, architecture and organization concepts of von Neumann machines, assemble level programming, exception handling, peripheral programming, floating point computations and memory management.

PREREQUISITE(S): CS1150

REQUIRED MATERIALS:

There is no required textbook. I will be using a variety of OER which I will be making available on myClass.

DELIVERY MODE(S): Onsite face-to-face

LEARNING OUTCOMES:

- Understand computer data representation
- Know basic processor architecture and memory management

- Be able to write, assemble, and debug RISC-V Assembler code
- Be able to perform conditional processing and Integer arithmetic, use code libraries, code procedures and advanced procedures and use string manipulation routines
- List the basic components of a modern CPU

TRANSFERABILITY:

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

** For courses with alpha (letter) grading, a 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:

Lab/Homework			
Assignments	20%		
Quizzes	10%		
Midterm 1 & 2	20% / 20 %		%
Final Exam	30%		

GRADING CRITERIA

Please note that most institutions 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	95-100		C+	2.3	67-69
A	4.0	85-94		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:

Introduction to Computer Architecture:

- Microprocessor and computer architecture
- Operations and operands of computer hardware
- Representing instructions

Number systems and Arithmetic

- Signed and Unsigned Numbers
- Addition and Subtraction
- Logical Operations
- Constructing an Arithmetic Logic Unit
- Multiplication and Division
- Floating Point numbers

RISCV Assembly

- Overview of RISCV assembly
- Program structure
- I/O operations
- Data movement instructions
- Conditionals and Branching instructions
- Arrays
- Procedures
- Interrupts
- String processing
- Parameter passing and stack operations

STUDENT RESPONSIBILITIES:

- The student must pass the theory/concepts portion of the course in order to qualify for a passing grade for the term. In other words, a student must obtain 40 out of a possible 80 points (from exams/quizzes) before adding the lab assignment marks to compute the final grade. If you cannot achieve the required 50% (on exams) then regardless of your lab assignment grades, you cannot pass the course.

- No late assignments will be accepted. The student is responsible for adhering to all requirements as specified for each assignment.
- Students must attend all lectures/labs. A student missing more than 20% of classes/labs
- may be barred from writing the final exam
- When necessary, lab time may be utilized for lecturing on specific Assembly language features. The remainder of the lab time will generally be used as "hands-on" programming time

STATEMENT ON ACADEMIC MISCONDUCT:

Academic Misconduct will not be tolerated. For a more precise definition of academic misconduct and its consequences, refer to the Student Rights and Responsibilities policy available <https://www.nwpolytech.ca/about/polytechnic-leadership/policies-directory>.

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