CMPUT 229 Computer Organization and Architecture I Course Outline

General Information

This is an in-person course. All lectures will be delivered in person, students are expected to attend labs in person, and all exams will be in-classroom in person.

Term:	Winter, 2025
Date:	MWF
Time	Lecture A1: 2:00PM-2:50PM
Location:	T LB-001
Number of credits:	3 credits

See the contact information for details about your instructor and teaching assistants.

Overview

General introduction to number representation, architecture and organization concepts, assembly-level programming, exception handling, programming to communicate with input/output devices, floating-point computations, and memory management.

Objectives

After this course, you will understand: how machine code is generated, by a compiler or by an assembly programmer; the interface between software and hardware; and the major issues with the design and implementation of parallel programs that run on multiple processors.

Pre-requisites

CMPUT 115 or CMPUT 175, and CMPUT 201.
Credit may be obtained in only one of CMPUT 229, 285, ECE 212 or EE 380.

Course Topics

1. Why Computer Architecture?
2. Instruction Set Architecture
3. Loops, Procedures, and Recursion.
4. Numerical Representation and Arithmetic for Computers
5. The Processor
6. Memory Hierarchy
7. Input/Output and Storage
8. Multicores and Multiprocessors

Course Work and Evaluation

Students are encouraged to complete all the coursework because each assignment is designed to cover a different portion of the course content. The deadline for labs and homework assignments, assessments, and final exams are posted to the e-class calendar.

Course Work	Weight
Homework & Quizzes	8%
Lab 1	2%
Lab 2	3%
Lab 3	5%
Lab 4	6%

Lab 5	5%
Lab 6	6%
Midterm	26%
Final Exam	39%

Assignment of Final Letter Grades: The assignment of the final letter grades starts by sorting the numerical grades obtained from the coursework listed above in decreasing order. An initial distribution of letter grades following the historical distribution of letter grades from previous editions of CMPUT 229 taught by the same professor is made. After this initial distribution, the cut points for letter grades are adjusted to reflect natural gaps found in the distribution of numerical grades for the current edition of the course. This final adjustment also considers the level of difficulty of the midterm and final in the current term based on the overall performance of the class in these exams.

There are variations in the lowest passing grade, the number of students who receive a letter grade F, and the average grade for the class. These variations are due to changes in the student population and variations in the difficulty level of the lab assignments, midterm, and final. The following historical data may provide a guide for students expectations this term.

Statistics from previous editions of CMPUT 229 taught by J. Nelson Amaral

	Fall 23	Fall 21	Fall 20	Fall 19
Number of students on day 1	198	220	226	-
Number of students writing the final	132	122	136	80
Average numerical/letter grade	69.8/C+	71.1/C+	68.4/B-	72.7/B-
Students writing final with a grade F	5	9	14	4
Lowest passing numerical/letter grade	49.4/D	48/D	47/D	46.4/D

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Course Materials

We will follow this textbook:

David Patterson and John Hennessy, *Computer Organization and Design: The Hardware/Software Interface*, RISC-V, 2nd edition, Morgan Kaufman, 2020.

We will also cover limited selected material from the following books (students do not need to buy these other books):

Alan Clements, *Principles of Computer Hardware*, 4th edition, Oxford University Press, 2006.

Yale N. Patt and Sanjay J. Patel, *Introduction to Computing Systems: From Bits and Gates to C and Beyond*, McGrawHill, 2001.

You may find the electronic version of the reference sheet here:

Green Sheet RISC-V Reference Data (both sides)

Green Sheet RISC-V Reference Data Front

Green Sheet RISC-V Reference Data Back

Computing Science Course Policies

This course follows the Department of Computing Science course policies. CMPUT 229 follows a consultation policy described in the department course policies for homework and lab assignments. Students can only discuss solutions for homework and lab assignments at a high level with other students who are taking CMPUT 229 during the same term in which they are taking it.

Academic Integrity

The University of Alberta is committed to the highest academic integrity and honesty standards. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students must familiarize themselves with:

- the University of Alberta Code of Student Behaviour;
- the College of Natural and Applied Sciences (CNAS) Academic Integrity Statement;

Students should avoid any behaviour that could result in suspicions of cheating, plagiarism, misrepresentation of facts, and/or participation in an offense. Academic dishonesty is a serious offense and can result in suspension or expulsion from the University. (GFC 29 SEP 2003)

Last modified: Monday, 30 December 2024, 3:48 AM