

Computer Architecture

Course Information

Code: 3P92.

Location: GC ST 108.

Period: January 10th – April 8th, 2022.

Time: Tuesdays and Thursdays (16:00 pm – 17:30 pm)

Couse web page: Sakai

Couse delivery: MS teams (during the on-line period)

Instructor

Name: Dr. Glaucio Carvalho

E-mail: gdecarvalho@brocku.ca

Office hours: email me to book an appointment

Prerequisites

Introduction to Computer Architecture (COSC 2P12) – Minimum of 60 percent.

Course Description

This course will provide students with a view of the organization and the design computer hardware. To this end, it will cover the following topics: number systems, computer arithmetic, combinational/sequential logic designs, hardware description languages, digital/computer systems building blocks, architecture & microarchitecture, and memory systems.

This course emphasizes experiential learning. In this respect, hardware description languages (VHDL) and other software tools will be leveraged to solidify concepts and promote learning while narrowing the gap between the classroom and the production.

References

Reference Books and Material:

1. *Digital Design and Computer Architecture: RISC-V Edition* by Sarah Harris, David Harris. Publisher: Morgan Kaufmann, 1st edition (Sept. 2021). ISBN-10:0128200642 & ISBN-13: 978-0128200643.
2. *Quick Start Guide to VHDL* by Brock J. LaMeres. Publisher: Springer; 1st edition (Jan. 2019). ISBN-10: 3030045153 & ISBN-13: 978-3030045159.

Topic Outline

Tentative plan's described in Table 1.

Table 1: Topic Outline

Week	Dates	Content	
1	Jan 11 & 13	Introduction	Chapter 1
2	Jan 18 & 20	Combinational Logic Design	Chapter 2
3	Jan 25 & 27	Sequential Logic Design	Chapter 3
4	Feb 1 & 3	Hardware Description Language	Chapter 4
5	Feb 8 & 10	Hardware Description Language	Chapter 4
6	Feb 15 & 17	Digital Building Blocks	Chapter 5
	Feb 21	Reading week	
7	Mar 1 & 3	Digital Building Blocks	Chapter 5
8	Mar 8 & 10	Architecture	Chapter 6
9	Mar 15 & 17	Architecture	Chapter 6
10	Mar 22 & 24	Microarchitecture	Chapter 7
11	Mar 29 & 31	Memory	Chapter 8
12	Apr 5 & 7	Review	Chapter 8

Grading

The course is composed of the following activities: Assignments, Quizzes, and a Final Exam. The Grading Schema of the course, which includes all these activities, is described in Table 2.

Table 2: Grading Schema

Activity	Marks
Assignments	3 @ 15 (45)%
Quizzes	3 @ 5 (15)%
Final Exam **	40%

** 40% of the exam is required to pass the course

Exam

Final exam will test students on the entire content.

Assignments

There will be three assignments throughout the term. The Tentative Schedule of the Assignments is defined in Table 3.

Table 3: Tentative Assignment Schedule

Assignment	Out
1	Feb 8
2	Mar 15
3	Mar 29

Structure, organization, and content of the assignments:

- **Organization.** Students can compose groups of **up to three members** to complete assignment submissions (single submission per group). Each submission **must** explicitly list its members: full names and student IDs.

Quizzes

There will be three scheduled quizzes throughout the term. The tentative quiz schedule is defined in Table 4.

Table 4: Tentative Quiz Schedule

Quiz	Date
1	Feb 3
2	Mar 3
3	Apr 5

Attendance

Attendance and participation is strongly recommended. Lectures might cover more content than in the textbook or examples, as well as study cases, other than presented in text books and lecture notes.

Absence

Students must notify the instructor their absence as early as possible. In case of health emergencies, students must provide a proof, a doctor's notice or a copy of a medical prescription, so they are allowed to re-take exams or postpone "deliverables".

Brock's medical policy requires the submission of the official medical certificate found [here](#).

Assignment Delivery and Late Assignment Policy *

Unless the delivery methods and time are explicitly specified in class by the instructor, Assignments and Reports must be delivered through Sakai until 11:55pm of the due date (Sakai). A penalty of 25% will be applied on late assignments. Late assignments are accepted until the Late Assignment Date, three days after the Assignment Due Date. No excuses are accepted for missing deadlines. However, deadline extensions may be granted under extenuating circumstances, such as medical or physical conditions; please note that granting the extension is under the instructor's discretion. However, deadline extensions may be granted under extenuating circumstances, such as medical or physical conditions; please note that granting the extension is under the instructor's discretion.

Plagiarism

Academic misconduct (which includes plagiarism and contract cheating) is NOT acceptable and will not be condoned. All borrowed work or ideas must be acknowledged. Work may be submitted to a phrase checking site. If you do not want your work to be submitted to a phrase checking site, alternative arrangements are available. More information on academic integrity is available [here](#), and in the lectures. If convicted of academic misconduct, the penalty can range from a minimum of zero with possible further penalties for the submission (assignment, test,...) for a first offence, and even additional penalties if it is a second or higher offence. If the academic misconduct occurs in one (or more) question(s) in the test or examination, a mark of zero will be given for the test or examination.

How to succeed in this course

This course covers a extensive amount of content and is very demanding on off-class activities. Students must keep up with their readings, assignments, as well as any other required activity.

In case you feel that you may be lagging behind, please do not hesitate in contacting me as soon as possible, so we have enough time to correct the issue that is affecting your progress in the course.

This course requires problem-solving and critical thinking to apply the content delivered in class. Students are encouraged to talk and help each other to understand concepts, problems, and solutions. However, students are not allowed to help writing programs, assignments, and quizzes. Copies of pieces of code or text from class colleagues are considered acts of plagiarism!