Lecture: MWF 2:00pm-2:50 pm Room: Knox 110 Instructor: Prof Ramalingam Sridhar (rsridhar@buffalo.edu) Office: 338K Davis Instructor Office Hours: Monday 1:00-3:00pm, Tuesday 1:30-3:30pm and/or by appointment Any change(s) to office hours during the semester will be announced in class. Office hours held at 338K Davis

TAs:

Aryan Pandey <u>aryanpan@buffalo.edu</u> Tyler DeAngelo <u>tddangel@buffalo.edu</u> Ronan Kasmier <u>ronankas@buffalo.edu</u> Anthony Roberts <u>ajr33@buffalo.edu</u>

		CSE 490/590 Schedule Spring 2025							
	Mon	Tues	Wed	Thurs	Fri		Lectures		
7:00 AM									
7:30 AM							Tyler D'Angelo Office Hour		
8:00 AM									Tyler D'Angelo
8:30 AM									
9:00 AM									
9:30 AM							Ronan Kasmier Office Hour		
10:00 AM									Ronan Kasmier
10:30 AM			Ronan Kasmier	Aryan Pandya					
11:00 AM			Office Hour	Office Hour					
11:30 AM							Aryan Pandey Office Hour		
12:00 PM									Aryan Pandey
12:30 PM									
1:00 PM	Dr Sridhar								
1:30 PM	Office Hour								
2:00 PM	Lecture Knox	Office Hour	Lecture		Lecture				
2:30 PM	104	o mes riour	Knox 104		Knox 104				
3:00 PM	Tyler D'Angelo		Tyler D'Angelo						
3:30 PM	Office Hour	Ronan Kasmier	Office Hour		Aryan Pandya				
4:00 PM		Office Hour		Office Hour	Office Hour				
4:30 PM				C					

Prerequisites: CSE341

Class website: http://www.cse.buffalo.edu/~rsridhar/cse490-590/

Text Book: Computer Architecture, Sixth Edition: A Quantitative Approach (The Morgan Kaufmann Series in Computer Architecture and Design) (6th Edition), 2017. John L. Hennessy and David A. Patterson

Reference Book: David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, 5th edition, Elsevier, 2014

Specific course information:

Computer architecture is the science and art of selecting and interconnecting hardware components to create a computer that meets functional, performance and cost goals. In this course, students will learn how to completely design a correct single processor computer, including processor datapath, processor control, pipelining optimization, instruction-level parallelism and multi-core, memory/cache systems, and I/O.

This course is targeted at senior-level undergraduates and first-year graduate students who already took CSE 341: Computer Organization and CSE: 241 Digital Systems or CSE220: Systems Programming. Students should have a good working understanding of digital logic, basic processor design and organization, pipelining, and simple cache design. computer organization, logic design, and the equivalent knowledge are necessary to succeed in computer architecture.

Brief list of topics covered

- a. Computer Architecture Overview
- b. Benchmarking and Evaluation
- c. Pipelining; Complex Pipelining
- d. Memory Review; Cache Design; Virtual Memory
- e. Instruction Level Parallelism; Dataflow
- f. Very Long Instruction Word Processor
- g. Data Level Parallelism
- h. Graphic Processing Units
- i. Loop Level Parallelism
- j. Domain specific architecture

Learning outcomes for the course:

- Will learn advanced concepts of computer design
- Will learn how to quantitatively measure and evaluate the performance of designs
- Will learn to use parallelism to improve performance as a whole

ABET Student Outcomes Support 0: Not Supported, 1: Introduced, 2: Practiced/Reinforced, 3: Mastered Computer Engineering (BS)

1	2	3	4	5	6	7
3	3	0	0	3	3	3

Computer Science (BS)

1	2	3	4	5	6
3	3	0	0	0	0

Accessibility Resources

If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources, 60 Capen Hall, 645-2608, and also the instructor of this course. The office will provide you with information and review appropriate arrangements for reasonable accommodations. https://www.buffalo.edu/studentlife/who-we-are/departments/accessibility.html

Syllabus Note

• It is entirely student's responsibility to follow these policies. Please make sure you read it thoroughly and ask the instructor if you have any questions.

Grading

- 3 Quizzes 10 % (4, 4, 2)
- 1 Midterm 25 %
- 1 Final 35 %
- 2 Projects 30 %

Grade Assignment: (Letter grades carry normal numerical values)

(90-100 = A, 88-89.9 = A, 86-87.9 = B, 80-85.9 = B, 78-79.9 = B, 75-77.9 = C+, 70-74.9 = C, 65-69.9 = C-, 60-64.9 = D, 1-59 = F). Curving may be applied if deemed appropriate by the instructor.

Late Submission Policy

• Completed projects are to be submitted by the deadline date and time specified

- Late submissions will result in a 20 % penalty per day. A day is defined as 24 hours after the day/time the assignment is due.
- No help will be available from the TAs or from the instructor for a project after its scheduled due date.
- After three (3) days delay, the assignment will no longer be accepted.

Homework Policy

• Homework assignments will be given, and will not be graded. They are used to help students become proficient with the material.

Regrading Policy

- Projects and exams may be submitted for regrades to correct grading errors if any.
- Regrade requests are due no later than the second class after the material is returned. If you don't pick up the material on the day it is returned, this does NOT extend the regrading deadline.
- Regrade requests must be clearly written and attached to the assignment.
- Regrades requests are intended to correct grading errors, NOT for negotiating a higher grade. When work is submitted for regrade, the entire work may be regraded, which could result in a lower grade.
- We may scan graded exams and project reports before returning. Read about academic integrity carefully before asking for regrade.

Exam (and Quiz) Policy

- No makeup exams will be given except in **provably extreme circumstances.** We need proof.
- Notify your instructor 24 hours prior to the exam via e-mail if you are going to miss an exam. If it is medically impossible for you to give prior notice, please obtain a note from a physician detailing the period (and the reason) you were medically incapable of communicating with the instructor.
- If you miss an examination because of sickness or similar reasons, you **must** visit a physician and obtain a note detailing the period and the reason you were medically incapable of taking the exam. No exception!
- You are responsible for knowing about the exam dates: you will get plenty of notice about the exam dates. Please plan your travel and other activities accordingly.
- Exam times are stressful and one could forget about the exam time. Please make sure you arrange for multiple reminders so that you do not forget about the exam(s).

Academic Integrity

- All work submitted for CSE 490/590 must be your own and must be done on an individual basis. We have zero tolerance on cheating (Quiz, project, or exam), which will result in automatic **failure** of the course.
- We will follow <u>CSE Department Policies on Academic Integrity.</u>
- *It is your responsibility to read these policies and penalties.*

Class Participation: Class participation is strongly encouraged.