ECE 621 Computer Organization (Winter 2021)

Instructor

Ziqiang Patrick Huang
Email: ziqiang.huang@uwaterloo.ca
Office: ███████
Office hours: TBD

Lectures

Pre-recorded Lectures Released at beginning of every week.

Teaching Assistant

TBD

Resources

We will use Piazza for class discussions, the Piazza course site is here
We will use LEARN for lecture notes, assignments, projects and grades

Synopsis

This course covers fundamental aspects of advanced computer architecture design and analysis with a focus on quantitative methods for cost and performance design tradeoffs. Topics include processor design, pipelining, superscalar, out-of-order execution, speculative execution, caches(memory hierarchies), multithreaded processors, multicores, simulation techniques, technology trends, and future challenges.

Prerequisites

C programming and basic understanding of instruction-set architectures, assembly language programming, pipelines and caches.

Textbook

Hennessy and Patterson. "Computer Architecture: A Quantitative Approach" 6th Edition, 2017.

Grading

10% Reading reports
30% Homeworks
30% Midterm

30% Project

Late Policy: Late submissions incur a 50% penalty when < 24 hours late, and receive no credit when > 24 hours late.

Reading Reports

Students will prepare an insightful critique of the assigned papers. These reports should take the form of a constructive paper review, including (1) summary, (2) strengths,(3) weaknesses, and (4) questions. These reports should be no longer than one page per paper. Reports should be done individually. Each paper report grade is out of 2 points: Good report = 2, poor report = 1, no report = 0.

Homework

Homework is assigned throughout the semester. There will be written assignments, programming (typically modifying a simulator), simulation and analysis of results. There will be 4 to 5 homeworks.

Project

The course project is expected to be completed in groups of 2 to 3 students. Typical projects involve implementing and exploring a microarchitectural idea using a simulator such as SimpleScalar. The project has two deliverables − (a) project proposal, (b) project report written in the style of research papers and assigned readings. Your project can be combined with ongoing research or a project in another course; either of these requires approval from all instructors and advisors involved.

Exams

There will be one take-home midterm.

Other Policies

Intellectual Property

Students should be aware that this course contains the intellectual property of their instructor, TA, and the University of Waterloo. Intellectual property includes items such as:
- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);

- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and

- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

Mental Health

If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support.

On-campus Resources

- Campus Wellness, https://uwaterloo.ca/campus-wellness/

- Counselling Services: counselling.services@uwaterloo.ca, 519-888-4567 ext 32655, Needles Hall North 2nd floor, (NH 2401)

- MATES: one-to-one peer support program offered by Federation of Students (FEDS) and Counselling Services: mates@uwaterloo.ca

- Health Services service: located across the creek from Student Life Centre, 519-888-4096 Off-campus Resources

- Good2Talk (24/7): Free confidential helpline for post-secondary students. Phone: 1-866-925-5454

- Here 24/7: Mental Health and Crisis Service Team. Phone: 1-844-437-3247

- OK2BME: set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Diversity

It is our intent that students from all diverse backgrounds and perspectives be well served by this course, and that students learning needs be addressed both in and out of class. We recognize the immense value of the diversity in identities, perspectives, and contributions that students bring, and the benefit it has on our educational environment. Your suggestions are encouraged and appreciated. Please let us know ways to improve the effectiveness of the course for you personally or for other students or student groups. In particular:

- We will gladly honour your request to address you by an alternate/preferred name or gender pronoun. Please advise us of this preference early in the semester so we may make appropriate changes to our records.

- We will honour your religious holidays and celebrations. Please inform of us these at the start of the course.

- We will follow AccessAbility Services guidelines and protocols on how to best support students with different learning needs.

University-wide Policies

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the Office of Academic Integrity for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4. When in doubt, please be certain to contact the departments administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check the Office of Academic Integrity for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about rules for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories

of offences and types of penalties, students should refer to Policy 71, Student Discipline. For typical penalties, check Guidelines for the Assessment of Penalties.

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals.

Note for students with specific learning needs: AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.