CS3350B, Winter 2025
Computer Architecture
Course Outline

Course Description

The goal of the course is to give students an understanding of modern computer architecture, with particular attention on how the underlying hardware of a computer system influences issues relating to application performance. To accomplish this, we will study the following topics:

- Abstraction of machine structures
- Performance metrics and profiling tools
- Hierarchical memory
- MIPS instruction set architecture and SPIM assembler and simulator
- Introduction to logic circuit design
- MIPS single cycle and multiple cycle CPU data-path and control
- Instruction level parallelism
- Multicore architecture and thread level parallelism
- GPU architecture

Prerequisites

CS2208, CS2210, CS2211, and either CS2209 or CS2101.

Anti-requisites: ECE 3375A/B.

Responsibility for checking prerequisites: Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Instructor

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Teaching Assistants (TAs)

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Course Materials

There is no specific textbook for this course. However, a suggested reading material is [Computer Architecture: A Quantitative Approach,](#) by Hennessy and Patterson. Another fine textbook is [Computer Organization and Design,](#) by Patterson and Hennessy. At least 5th edition of each.

Lecture notes, suggested readings and supplementary materials are available electronically on the course website (see below).

Course lecture notes will be made available in PDF on the OWL website of the course. They are provided as a courtesy by the course instructor. Possessing (and even reading) these notes is not a suitable substitute for attending lectures.

Course Website

Students should check the [OWL web site](#) on a regular basis for news and updates.

The OWL web site is the primary method by which information will be disseminated to all students in the class. The missing of critical information due to your failure to check the course website or OWL cannot be used as a basis for appeal.

Class Schedule

Mondays, 9:30 - 11:30 ▮▮▮▮▮▮ and Wednesdays 10:30 - 11:30 ▮▮▮▮▮▮

Special Dates

- Jan 6, 2025: classes resume
- Feb 15- Feb 23 Spring Reading Week
- April 4, 2025 classes end

Polices regarding email and contact

For all questions related to the course materials (lectures, assignments, quizzes and the final exam) students **must use the discussions (forum)** of the OWL web sites (see above) instead of contacting the instructor or the TA by email. Indeed any question about a course material is likely to be of interest to many students in the class.

Writing to the instructor or the TAs should only be done for handling a personal matter, not relevant to the course materials.

Protection of online content

The instructor owns the intellectual property (IP) of the lecture materials even when such materials are posted online. Students are not permitted to post lecture materials including assignment statements, assignment

solutions, etc. to any other websites or platforms or use the lecture recording or materials for any other purpose.

Participants in this course are not permitted to record the Zoom sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Computer requirements

Students must have a reliable internet connection and computer that are compatible with online learning (including working microphone and webcam) and testing system requirements.

As for web browser, using [Mozilla Firefox v20.0 or Higher](#)is required.

Lecture attendance

All students are expected to attend all classes.

Student Evaluation

The overall course grade, out of 100, will be calculated as follows:

- 4 in-class quizzes about key concepts and principles, each worth 5%, the sum of which will constitute 20% of the final grade;
- 4 assignments, each worth 10%, the sum of which will constitute 40% of the final grade;
- No midterm exam;
- the final exam worth 40%.

None of the components will be dropped, and it is not possible to have the components re-weighted unless they were legitimately missed.

It is Faculty of Science policy that a student who chooses to write a test or exam deems themselves fit enough to do so, and the student must accept the mark obtained. Claims of medical, physical, or emotional distress after the fact will not be considered.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Computer-marked, multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Late assignments cost 10% of the assignment mark per day late unless an extension has been granted. After a week has passed from the due-date no assignments will be accepted for marking.

To obtain a passing grade in the course, a student must obtain at least 50% on the final exam and at least 50% on the weighted average on the quizzes, assignments and final exam.

Every effort will be made to have homework assignments and quizzes marked and handed back within 2 weeks of the hand-in date. If we are unable to comply with our intended return dates, revised dates will be posted on the course website.

Tentative Assignment and Quiz Schedule

	Posted/Given	**Due**	**Weight**
Assignment 1	Th. Jan. 16	Fr. Jan. 31, midnight	10%
Quiz 1	Wed. Jan. 22	in class	5%
Assignment 2	Th. Feb. 6	Fr. Feb. 21, midnight	10%
Quiz 2	Wed. Feb. 12	in class	5%
Assignment 3	Th. Mar. 6	Fri. Mar. 21, midnight	10%
Quiz 3	Wed. Mar. 12	in class	5%
Assignment 4	Th. Mar. 20	Fri. Apr. 4, midnight	10%
Quiz 4	Wed. Mar. 26	in class	5%
Final Exam	TBA		40%

Assignment, Quiz and Exam Rules

- If for any reason the assignment and quiz schedule cannot be adhered to, the marks will be pro-rated.
- Assignment descriptions will be posted on the OWL website at least one week before the due date.
- Any changes, updates, and clarifications to assignments will also be posted on the OWL website. It is the student responsibility to monitor these pages closely.
- The submission of assignments and quizzes is electronic using OWL.
- When a student submits an assignment or a quiz for evaluation, this student automatically certifies that the material they have handed in is exclusively their own work.
- No electronic devices may be in the possession of students during quizzes and the Final Exam.
- The Final Exam is close-book. A reference sheet (provided by the instructor) is allowed for the Final Exam.
- In case of questions regarding the marks, please note that no quizzes or exams will be accepted for re-marking later than two weeks after they have been marked. We reserve the right not to re-mark quizzes or exams that have been written in pencil.
- It is your responsibility to keep up-to-date backups of assignment disk files in case of system crashes or inadvertently erased files. Retain disk copies of all material handed in, as well as the actual graded assignment, to guard against the possibility of lost assignments or errors in recording marks. It is not safe to discard these materials until you are satisfied that your final mark for the course has been computed properly.

Academic accommodation for medical illness

There are no make-up quizzes.

Students are allowed one un-documented absence to a quiz. In this case, the value of the missed quiz will be reallocated to the other quizzes.

Students are allowed one un-documented delay of maximum one week for one assignment submission.

If you are unable to meet a course requirement (quiz participation or assignment due date, beyond the undocumented absences mentioned above) due to illness or other serious circumstances, you can submit a request for academic consideration through the [Student Absence Portal.](#) If the request is granted, then the value (resp. due date) of the missed quiz (resp. assignment) will be reallocated (resp. extended by one week).

For policy on Academic Consideration for Student Absences, follow this [link.](#)

Accommodation policies

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found here.

Religious accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar.

Academic policies

The website for Registrarial Services is here.

In accordance with this policy, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

All of the remote learning sessions for this course may be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings.

As mentioned above, participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Ethical conduct

Scholastic offences are taken **seriously** and students are directed to read the appropriate policy, specifically, the definition of what constitutes a **Scholastic Offence,** at this website.

Computer-marked, multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating. In particular, checking software, such as MOSS , Turnitin or others will be used randomly for detecting similarity in assignment submission.

All assignments are individual assignments. You may discuss approaches to problems among yourselves. However, the actual details of the work (assignment coding, answers to concept questions, etc.) must be your individual effort. Assignments that are judged to be the result of academic dishonesty will, for the student's first offence. You are responsible for reading and respecting the Computer Science Department's policy on Rules of Ethical Conduct and Scholastic Offenses.

Support services

Please visit the Science & Basic Medical Sciences Academic Counselling web page for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters.

Please contact the course instructor if you require lecture in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at

(519) 661-2147 if you have any questions regarding accommodation.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being. .

Learning-skills counsellors at the Student Development Centre. are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling. See also the services provided by the University Students' Council.

Marc Moreno Maza
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