



Syllabus for CSE140-01: Computer Architecture

Fall 2019

Instructor: Chi Yan Leung

Designation:	Computer Architecture
Catalog Description:	This course covers basic concepts and recent developments of computer architecture, using the MIPS process as a primary example.
Text Books and Other Required Materials:	<ol style="list-style-type: none">1. Sign in or create an account at learn.zybooks.com2. Enter zyBook code: UCMERCEDCSE140LeungFall20193. Click 'Subscribe' <p>Each student MUST subscribe his/her own copy with UC Merced email address. Participation grade will be partly evaluated based on the activities within the subscription account.</p>
Course Objectives/ Student Learning Outcomes:	<p>Students will learn the arithmetics and components of a modern computer. Students will start from a basic single cycle CPU. Then move to pipelined instruction-level parallelism (ILP). How branch prediction and speculation are used to keep the pipeline full as basis for modern ideas. Then modern architectures features for parallelization at different levels: instruction, thread, process and task.</p> <p>Students will be able to:</p> <ul style="list-style-type: none">Understand basics of computer architecture elements for in-order executionDesign different architecture features to improve performance for in-order computersUnderstand out of order execution and speculative execution semanticsDifferentiate RISC vs CISC architectures and tradeoffsUnderstand modern architecture optimizations for parallelization
Program Learning Outcomes:	<p>A An ability to apply knowledge of computing and mathematics appropriate to the discipline;</p> <p>B An ability to analyze a problem and identify the computing requirements appropriate for its solution; An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, and use current techniques, skill, and tools necessary for computing practice.</p> <p>H An ability to apply mathematical foundations, algorithmic principles, and computer science theory to the modeling and design of computer based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices</p>
Prerequisites by Topic:	CSE 31: Computer Organization
Course Policies:	<p>LABS:</p> <ul style="list-style-type: none">- Attendances are mandatory- Each assignment is closed at 11:59pm of the 7th day after it is assigned. You cannot submit any work after it is closed.- If you expect to submit your work late, you must request for approval from your instructor only BEFORE the due date.

- All late submission requests after the due date will not be considered unless accompanied with proper documentations of excuses.

PROJECTS:

Each student must write their programs as an individual or in pairs. You may talk with other students about general approaches to the problem, but you may not allow others to see your code, nor may you ask to see another student's code. After submission of your project, you must demo your work at a scheduled time. ALL submitted projects without demo will NOT BE GRADED.

A software similarity test will be performed on your submission against the submissions of your class as well as classes in the past few years. If your program is flagged as very similar to any program other than your group partner's program (you are allowed to work in a group of max. 2 students) and cannot explain why during your demo of your project, your instructor is required to report the incident to the School of Engineering for them to investigate.

To prevent your program from being flagged, follow the suggestions below when you write your program:

- Avoid writing programs as a group, unless you are working as one group or practicing paired programming. Even so, you need to implement your portion of the program alone.
- It is fine to collaborate with one another in terms of solving a problem. Once you have reached a solution with an abstraction of pseudocode, you should complete your pseudocode and implement the code alone. This will ensure that your code won't look similar to others' code.
- It is fine to use third-party source code as part of your program; however, the source code must be open-sourced and you must give proper credits to the sources (as comments). Keep in mind, your program is not your work if it is mainly composed of someone else's work. Just like a paper you write that contains only quotes from others is not really considered as your creative work (that's plagiarism).

You may, of course, seek assistance from your TAs and instructor for all the assignments. There are also tutors available from PALS.

Computer Science Department Policy on Academic Honesty

Please visit the CatCourses (under Files section) to view the new policy from the CSE Department.

Academic Dishonesty Statement:

- a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.
- b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.
- c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from

others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Disability Statement:

Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.

Topics:

Instruction set architecture
MIPS Assembly language
Computer arithmetic Performance
Datapath and control
Design Caches and virtual memory
Peripherals : input/output
Instruction and data level parallelism
Multiprocessors
Graphics processing unit

**Class/laboratory
Schedule:**

Lecture: T/R: 1:30-2:45pm COB 120; Labs: Please see class schedule for time and locaton

**Midterm/Final Exam
Schedule:**

Midterms: October 10, November 21 (in class)
Final : December 20 (COB 120, classroom)

Course Calendar:

**Professional
Component:**

**Assessment/Grading
Policy:**

15% Lab/HW
20% Projects
10% Quizzes
10% Participation
20% Midterms
25% Final

Coordinator:

Chi Yan (Daniel) Leung

Contact Information:

Email: cleung3@ucmerced.edu
I will try to answer your emails within 48 hours. However, I may not answer email after 5:00 p.m. or on weekends. Please plan accordingly.

Office Hours:

T/R: 10:00am-12:00pm (AOA 126)
W: 3:00pm- 4:30pm (AOA 126)
or by appointment