**EECS 250: Distributed Computing (Spring 2019)**

**Credits:** 4

**Instructor:** Mukesh Singhal, Professor.

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**Course Description**:

The course will cover the following topics, roughly in the given order:

1. Definition, motivations, and design issues
2. Global snapshot/state collection
3. Distributed event ordering and timestamps
4. Distributed mutual exclusion
5. Intersection control algorithms (self-driving cars/vehicles)
6. Distributed deadlock detection/avoidance
7. Failure recovery and fault-tolerance
8. Authentication Protocols
9. Digital cash, Blockchain and distributed ledgers

**Prerequisites**

Operating systems (CSE 150) and Computer networks (CSE 160), or the consent of the instructor.

**Examinations**

There will be one midterm examination during the semester (on Tuesday, March 15, 2019 in class) and a final examination (on Tuesday, May 14, 2019, 3-6PM).

**Grading**

A student's grade will be determined by a weighted average of a paper/report presentation, a midterm examination, and the final examination.

Presentation or Report: 30%
Midterm: 30%
Final Examination: 40%

Letter Grades: Letter Grades: A => 90%, B => 80%, C => 70%.

## Course Learning Outcomes

The students will demonstrate understanding of the following concepts in the design and development of distributed computing systems: definition and classifications, motivations and economics of distributed computing, time and space management, mutual exclusion, deadlock detection, failure recovery, resource allocation, scheduling and load balancing, and security management and authentication. The students will be able to solve various problems in the design, implementation, and deployment of distributed computing systems. The students will be able to design and conduct experiments on various distributed computing systems available in the industry.

## Program Learning Outcomes

- Ability to design and conduct experiments and numerical simulations of complex electrical, electronic and computer systems, to analyze, and interpret general scientific and engineering information.
- A dedication to advance engineering research to discover new knowledge, develop new methodologies, promote innovative thinking and research output in engineering and science.

## Academic Honesty

Students are expected to abide by the UC Merced campus-wide Academic Honesty Policy which can be found at http://studentlife.ucmerced.edu/what-we-do/student-judicial-affairs/academicy-honesty-policy. Academic misconduct is a serious offense. Violation of these policies may result in a grade of "F" or 0 points for the assignment or exam, or for more serious violations, a grade of "F" in the course, at the discretion of the instructor.

## Special Needs

UC Merced provides individuals with disabilities reasonable accommodations to participate in educational programs, activities, and services. Students with disabilities requiring accommodations to meet course requirements should contact the UCM Disability Services Center (http://disability.ucmerced.edu/) to obtain assistance and coordination with this course.

## Textbook

Ajay D. Kshemkalyani and Mukesh Singhal,
**Distributed Computing: Principles, Algorithms, and Systems,**
Cambridge University Press, UK, 2008, 755 pages.

## Papers from the literature.