



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Distributed Algorithms

CSE 6333

Credit Hours:

3.00 - 3.00

Course Levels:

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Fundamental concepts in distributed computing; algorithms for distributed control and data; impossibility and limits; algorithms for fault-tolerance; specification, design and verification of distributed programs.

Prerequisites and Co-requisites:

Prereq: 6431 (760).

Course Goals / Objectives:

- Master the principles behind several specific classes of distributed algorithms for solving particular problems
 - Master reading and understanding distributed algorithms
 - Be familiar with writing and designing distributed programs
 - Be familiar with the analysis and verification of distributed programs
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Course Topics:

- Global Time and Order: logical clock, vector clock, causal order and broadcast, clock synchronization algorithms.
 - Global State and Predicate Detection: consistency, snapshots, termination detection algorithms.
 - Programming Notation and Logic: syntax and semantics for distributed programs, safety and progress properties, a UNITY-style temporal logic, proofs of program properties, examples, fairness.
 - Fault-Tolerance: consensus, impossibility of robust consensus, leader election, atomic commitment, Byzantine agreement, Paxos, self-stabilization, distributed reset.
 - Wait-freedom: atomic register algorithms.
 - Distributed and Concurrent Data Structures: queues, skip lists, hash sets, linearizability.
 - Scalability: local, geometric, dense network, small world algorithms.
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Designation:

Elective