Somewhat Less Tentative Course Schedule

Lecture 1 (Thursday, Sept. 9) Course overview. Synchronous networks. Leader election in ring networks. Homework 1a out.

Lecture 2 (Tuesday, Sept. 14) Leader election in ring networks and general networks.

Lecture 3 (Thursday, Sept. 16) Computation in general synchronous networks. Breadth-first search. Shortest paths. Broadcast and convergecast. Minimum spanning tree. Homework 1b out.

Lecture 4 (Tuesday, Sept. 21) Fault-tolerant consensus problems. Link failures: the Two Generals problem. Process failures (stopping, Byzantine). Algorithms for stopping agreement. Exponential information gathering.

Lecture 5 (Thursday, Sept. 23) Time bounds for consensus problems. Byzantine agreement. EIG algorithm for Byzantine agreement. Homework 1 due; Homework 2a out.

Lecture 6 (Tuesday, Sept. 28) EIG algorithm for Byzantine agreement, cont'd. Binary vs. general-value Byzantine agreement. Processor and connectivity bounds for consensus problems. Weak Byzantine agreement.

Lecture 7 (Thursday, Sept. 30) k-agreement. Distributed commit: 2-phase and 3-phase commit algorithms. Asynchronous systems. I/O automata. Modeling asynchronous systems. Homework 2b out.

Lecture 8 (Tuesday, Oct. 5) Modeling and proofs for asynchronous systems.

Lecture 9 (Thursday, Oct. 7) Simulation relation proofs for asynchronous systems. Asynchronous network systems. Leader election in asynchronous networks.
Homework 2 due. Homework 3a out.

Lecture 10 (Tuesday, Oct. 12) Leader election. Breadth-first search, shortest paths. Broadcast and convergecast. Minimum spanning tree.

Lecture 11 (Thursday, Oct. 14) Minimum spanning tree, cont'd. Synchronizers.
Homework 3b out.

Lecture 12 (Tuesday, Oct. 19) Synchronizer applications. Synchronous vs. asynchronous distributed systems. Asynchronous shared memory systems. The mutual exclusion problem. Dijkstra's mutual exclusion algorithm.

Lecture 13 (Thursday, Oct. 21) Other mutual exclusion algorithms: Peterson, Burns, Lamport. Bound on shared read/write variables for mutual exclusion. Homework 3 due; Homework 4a out.

Lecture 14 (Tuesday, Oct. 26) Dining Philosophers. Impossibility of consensus in asynchronous shared memory systems. Atomic objects.

Lecture 15 (Thursday, Oct. 28) Atomic snapshot algorithms. Atomic read/write register algorithms. Translations between asynchronous network model and asynchronous shared memory model. Impossibility of consensus in asynchronous networks. Reducibilities for problems in asynchronous networks.
Proposals for class projects due. Homework 4b out.

Lecture 16 (Tuesday, Nov. 2) Failure detectors. Consensus, commit and broadcast.

Lecture 17 (Thursday, Nov. 4) Time, clocks, ordering of events. State-machine simulation. Applications.
Homework 4 due. Homework 5a out.

Lecture 18 (Tuesday, Nov. 9) Distributed termination. Global snapshots. Stable property detection. Deadlock detection. Homework 5b out.

Veteran's Day Holiday (Thursday, Nov. 11)

Lecture 19 (Tuesday, Nov. 16) Communication. Data link protocols.

Lecture 20 (Thursday, Nov. 18) Data link protocols, cont'd.
Homework 5 due. Homework 6a out.

Lecture 21 (Tuesday, Nov. 23) Timing-based systems. Modeling and verification. Mutual exclusion. Consensus. Homework 6b out.

Thanksgiving Holiday (Thursday, Nov. 25)

Lecture 22 (Tuesday, Nov. 30) Reliable distributed computing. Group membership services. View-oriented group communication services. State transfer between views. Applications: Short-term and long-term data consistency, highly available servers, resource allocation. Service specifications.

Lecture 23 (Thursday, Dec. 2) Service specifications, cont'd: Static universe view services. Dynamic universe view and configuration services. Services with transitional views. Applications using the specs: Highly available servers. Totally ordered broadcast.
Homework 6 due.

Lecture 24 (Tuesday, Dec. 7) Applications using the specs, cont'd: Long-term data consistency. Consensus. Resource allocation.

Lecture 25 (Thursday, Dec. 9) Implementations of group communication services: Static services. Dynamic services. Transitional views. **Project reports due.**

Optional Meeting 26 (Friday, Dec. 10, 9-1) Student project presentations.