Tentative Course Schedule

Class 1 (Thursday, Sept. 6) :
Course overview. Synchronous networks. Leader election in synchronous ring networks.
Homework 1a handed out.

Class 2 (Tuesday, Sept. 11) :
Basic computational tasks in general synchronous networks: Leader election. Breadth-first search. Shortest paths, Broadcast and convergecast.

Class 3 (Thursday, Sept. 13) :
Spanning trees. Minimum spanning trees.
Homework 1b handed out.

Class 4 (Tuesday, Sept. 18) :
Fault-tolerant consensus problems. Link failures : The Two Generals problem. Process failures (stopping, Byzantine). Algorithms for agreement with stopping and Byzantine failures. Exponential information gathering.

Class 5 (Thursday, Sept. 20) :
Number-of-processor bounds for Byzantine agreement. Weak Byzantine agreement. Time bounds for consensus problems.
Homework 1 due. Deadline for choosing Basic or Advanced track, and for proposing a presentation topic.
Homework 2a handed out.

Class 6 (Tuesday, Sept. 25) :
Other kinds of consensus problems : k-agreement. Approximate agreement. Distributed commit.

Class 7 (Thursday, Sept. 27) :
Asynchronous distributed computing. Formal modeling of asynchronous systems using interacting state machines (I/O automata). Proof methods.
Homework 2b handed out.

Class 8 (Tuesday, Oct. 2) :
Asynchronous message-passing systems. Modeling asynchronous message-passing systems. Basic computational tasks in asynchronous networks. Leader election. Breadth-first search, shortest paths, broadcast and convergecast.

Class 9 (Thursday, Oct. 4) :
Spanning trees in asynchronous networks. Minimum spanning trees.
Homework 2 due.
Homework 3a handed out.

Tuesday, Oct. 9 : Columbus Day vacation. No class.

Class 10 (Thursday, Oct. 11) :
Synchronizers. Synchronizer applications. Synchronous vs. asynchronous distributed systems.
Homework 3b handed out.

Class 11 (Tuesday, Oct. 16) :
Asynchronous shared-memory systems. Modeling. The mutual exclusion problem. Mutual exclusion algorithms.

Class 12 (Thursday, Oct. 18) :
More mutual exclusion algorithms.
Homework 3 due.
Homework 4a handed out.

Class 13 (Tuesday, Oct. 23) :
Bounds on shared memory for mutual exclusion. Resource allocation. The Dining Philosophers problem.

Class 14 (Thursday, Oct. 25) :
Impossibility of consensus in asynchronous shared memory systems.
Homework 4b handed out.

Class 15 (Tuesday, Oct. 30) :
Atomic objects.

Class 16 (Thursday, Nov. 1) :
Atomic snapshot algorithms. Atomic read/write register algorithms.
Homework 4 due.
Homework 5a handed out.

Class 17 (Tuesday, Nov. 6) :
Translations between asynchronous network model and asynchronous shared memory model. Impossibility of consensus in asynchronous network models. Failure detectors. Consensus and atomic broadcast.

Class 18 (Thursday, Nov. 8) :
Time, clocks, and the ordering of events. State-machine simulation. Applications.
Homework 5b handed out.

Class 19 (Tuesday, Nov. 13) :
Stable property detection. Distributed termination. Global snapshots. Deadlock detection.

Class 20 (Thursday, Nov. 15) :
Reliable communication using unreliable channels.
Homework 5 due. Deadline for first meeting about presentation.
Homework 6a handed out.

Class 21 (Tuesday, Nov. 20) :
Timing-based systems. Modeling and verification.

Thursday, Nov. 22 : Thanksgiving Day vacation. No class.

Class 22 (Tuesday, Nov. 27) :
Timing-based systems. Mutual exclusion. Consensus.

Class 23 (Thursday, Nov. 29) :
Student presentations. Topics to be announced.
Homework 6b handed out.

Class 24 (Tuesday, Dec. 4) :
Student presentations.

Class 25 (Thursday, Dec. 6) :
Student presentations.
Homework 6 due.

Class 26 (Tuesday, Dec. 11) :
Student presentations.