Course Schedule, Version 1

Class 1 (Wednesday, February 7): Seth Gilbert
Course overview. Physical characteristics of mobile wireless ad hoc networks.
Schiller. Mobile Communication, Chapters 1 and 2.
Vaidya's notes on the physical layer.
Balakrishan's 6.829 notes, Lecture 11.

Class 2 (Monday, February 13): Nancy Lynch
MAC layer: Gallager. A perspective on multiaccess channels.
Komlos, Greenberg. An asymptotically nonadaptive algorithm for conflict resolution in multiple-access channels.
Schiller. Mobile Communication, Chapter 3.
Vaidya's notes on the MAC layer.

Class 3 (Wednesday, February 15): Nancy Lynch
MAC layer: Brenner. A technical tutorial on the IEEE 802.11 protocol.
Bharghavan, Demers, Shenker, Zhang. MACAW: A media access protocol for wireless LANs.
Homework 1a handed out

Class 4 (Tuesday, February 21) Tina Nolte, Nancy Lynch
Localization: Savvides, Han, Srivastava. Dynamic fine-grained localization in ad-hoc networks of sensors.
Priyantha, Chakraborty, Balakrishnan. The Cricket location-support system.
Priyantha, Balakrishnan, Demaine, Teller. Mobile-assisted localization in wireless sensor networks.

Class 5 (Wednesday, February 22): Tina Nolte, Nancy Lynch
Localization: Moore, Leonard, Rus, Teller. Robust distributed networks localization with noisy range measurements.
Aspnes, Eren, Goldenberg, Morse, Whiteley, Yang, Anderson, Belhumeur. A theory of network localization.
Homework 1b handed out

Class 6 (Monday, February 27): Rui Fan
Time synchronization: Elson, Girod, Estrin. Fine-grained network time synchronization using reference broadcasts.
Karp, Elson, Papadimitriou, Shenker. Global synchronization in sensornets.
Su, Akyildiz. Time-diffusion synchronization protocol for wireless sensor networks.

Class 7 (Wednesday, March 1): Rui Fan
Time synchronization: Fan, Lynch. Gradient clock synchronization.
Fan, Chakraborty, Lynch. Clock synchronization for wireless networks.
Attiya, Hay, Welch. Optimal clock synchronization under energy constraints in wireless ad hoc networks.
Homework 1 due
Homework 2a handed out

Class 8 (Monday, March 6): StudentX
Topology control: Li, Halpern, Bahl, Wang, Wattenhofer. Analysis of a cone-based distributed topology control algorithm for wireless multi-hop networks.
Bahramgiri, Hajiaghayi, Mirrokni. Fault-tolerant and three-dimensional distributed topology control algorithms in wireless multi-hop networks.

Class 9 (Wednesday, March 8): Seth Gilbert

Local infrastructure: Chockler, Demirbas, Gilbert, Newport, Nolte. Consensus and collisions detectors in wireless ad hoc networks.
Chockler, Gilbert. Replicated state machines for collision-prone wireless networks.
Luo, Hubaux. NASCENT: Network Layer Service for Vicinity Ad-hoc Groups.
Welsh, Mainland. Programming sensor networks using abstract regions.
Homework 2b handed out

Class 10 (Monday, March 13): Nancy Lynch, StudentX

Network broadcast: Bar-Yehuda, Goldreich, Itai. On the time complexity of broadcast in multi-hop radio networks: An exponential gap between determinism and randomization.
Bar-Yehuda, Goldreich, Itai. An efficient emulation of single-hop radio network with collision detection on mul.ti-hop radio network with no collision detection.
Kowalski, Pelc. A time of deterministic broadcasting in radio networks with local knowledge.

Class 11 (Wednesday, March 15): Nancy Lynch, StudentX

Broadcast: Kushelevits, Mansour. An Omega(D log(N/D)) lower bound for broadcast in ratio networks.
Gupta, Kumar. The capacity of wireless networks.
Livadas, Lynch. A reliable broadcast scheme for sensor networks.
Chockler, Demirbas, Gilbert, Newport. A middleware framework for robust applications in wireless ad hoc networks.
Homework 2 due
Homework 3a handed out

Class 12 (Monday, March 20): Calvin Newport Point-to-point routing: Karp. Slides on routing in mobile networks.
Johnson, Maltz. Dynamic source routing in ad hoc wireless networks.
De Couto, Aguayom, Bicket, Morris. A high-throughput path metric for multi-hop wireless routing.
Perkins, Royer. Ad hoc on-demand distance-vector routing.
Hu, Johnson. Caching strategies in on-demand routing protocols for wireless ad-hoc networks.
Chen, Murphy. Enabling disconnected transitive communication in mobile ad hoc networks.

Class 13 (Wednesday, March 22): Calvin Newport

Point-to-point routing: Link-reversal routing algorithms: Gafni, Bertsekas. Distributed algorithms for generating loop-free routes in networks with frequently changing topology.
Park, Corson. A highly adaptive distributed routing algorithm for mobile ad hoc networks.
Busch, Surapaneni, Tirthapura. Analysis of link reversal routing algorithms for mobile ad hoc networks.
Homework 3b handed out

(Monday, March 27 and Wednesday, March 29) Spring break, no classes.

Class 14 (Monday, April 3): Nancy Lynch, Calvin Newport

Point-to-point routing: Location-free routing:
Rao, Papadimitriou, Shenker, Stoica. Geographical routing without location information.
Fang, Gao, Guibas, de Silva, Zhang. GLIDER: Gradient Landmark-based Distributed Routing for Sensor Networks.
Fonseca, Ratsanamy, Zhao, Ee, Coller, Shenker, Stoica. Beacon Vector Routing: Scalable Point-to-point routing in wireless sensornets.

Other possible papers on routing, which might replace some of the scheduled routing papers:
Broch, Maltz, Johnson, Hu, Jetcheva. A performance comparison of multi-hop wireless ad hoc network routing protocols.
Biswas, Morris. ExOR: opportunistic multi-hop routing for wireless networks.

Class 15 (Wednesday, April 5): Nancy Lynch, David Karger, StudentX
Location services: Awerbuch, Peleg. Concurrent online tracking of mobile users.
Jannotti, DeCouto, Karger, Morris. A scalable location service for geographic ad hoc routing.
Abraham, Dolev, Malkhi. LLS: A locality-aware location service for mobile ad hoc networks.
Homework 3 due
Homework 4a handed out

Class 16 (Monday, April 10): StudentX
Location-based routing:
Ko, Vaidya. Geocasting in mobile ad-hoc networks: location-based multicast algorithms.
Ko, Vaidya. Location-aided routing (LAR) in mobile ad hoc networks.
Kranakis, Singh, Urrutia. Compass routing on geometric networks.
Karp, Kung. GPSR: Greedy perimeter stateless routing for wireless networks.
Abraham, Malkhi. Compact routing on Euclidean metrics.

Class 17 (Wednesday, April 12): StudentX
Location-based routing:
Bose, Morin, Stojmenovic, Urrutia. Routing with guaranteed delivery in ad hoc wireless networks.
Barriere, Fraignaud, Narayanan. Robust position-based routing in wireless ad hoc networks with unstable transmission ranges.
Kuhn, Wattenhofer, Zhang, Zollinger. Geometric ad hoc routing: Of theory and practice. **Homework 4b handed out**

(Monday, April 17) Patriot's Day, no class.

Class 18 (Wednesday, April 19): Rui Fan, StudentX
Global infrastructure: Elkin. Distributed approximations—a survey.
Wattenhofer. Algorithms for ad hoc networks (case study clustering).
Kuhn, Wattenhofer. Constant-time distributed dominating set approximation.
Kuhn, Moscibroda, Wattenhofer. On the locality of bounded growth.
Homework 4 due
Homework 5a handed out

Class 19 (Monday, April 24): Rui Fan, StudentX, Tina Nolte
Global infrastructure: Moscibroda, Wattenhofer. Maximal independent sets in radio networks.
Kuhn, Moscibroda, Wattenhofer. What cannot be computed locally!
Kuhn, Wattenhofer, Zollinger. Ad-hoc networks beyond unit-disk graphs.
Mittal, Demirbas, Arora. Local clustering in large-scale wireless networks.

Class 20 (Wednesday, April 26): StudentX
Middleware services: Token circulation, leader election: Malpani, Chen, Vaidya, Welch. Distributed token circulation in mobile ad hoc networks.
Malpani, Welch, Vaidya. Leader election algorithms for mobile ad hoc networks.
Angluin, Aspnes, Fischer, Jiang. Self-stabilizing population protocols. **Homework 5b handed out**

Class 21 (Monday, May 1): StudentX
Middleware services: Mutual exclusion, resource allocation: Walter, Welch, Vaidya. A mutual exclusion algorithm for ad hoc mobile networks.
Chen, Welch. Self-stabilizing dynamic mutual exclusion for mobile ad hoc networks.
Bulgannawar, Vaidya. A distributed k-mutual-exclusion algorithm.
Walter, Cao, Mohanty. A k-mutual-exclusion algorithm for wireless ad hoc networks.
Group communication: Dolev, Schiller, Welch. Random walk for self-stabilizing group communication in ad hoc networks.

Class 22 (Wednesday, May 3): Seth Gilbert
Virtual objects: Dolev, Gilbert, Lynch, Shvartsman, Welch. GeoQuorums: Implementing atomic memory in ad hoc networks.

Compulsory protocols: Hatzis, Pentaris, Spirakis, Tampakas, Tan. Fundamental control algorithms in mobile networks.
Chatzigiannakis, Nikoletseas, Spirakis. On the average and worst-case efficiency of some new distributed communication and control algorithms for ad-hoc networks.
Chatzigiannakis, Nikoletseas, Spirakis. An efficient communication strategy for ad-hoc mobile networks.
Chatzigiannakis, Nikoletseas, Spirakis. An efficient routing protocol for hierarchical ad-hoc mobile networks.
Homework 5 due
Homework 6a handed out

Class 23 (Monday, May 8): Seth Gilbert, Tina Nolte
Virtual node layers: Dolev, Gilbert, Lynch, Schiller, Shvartsman, Welch. Virtual mobile Nodes for nobile ad hoc networks.
Dolev, Gilbert, Lahiani, Lynch, Nolte. Timed virtual stationary automata.
Dolev, Lahiani, Lynch, Nolte. Self-stabilizing mobile node location management and message routing.
Luo, Eugster, Hubaux. Pilot: Probabilistic lightweight group communication system for ad hoc networks.

Class 24 (Wednesday, May 10): Jim Aspnes
Applications: Data aggregation:
Shrivastava, Buragohain, Agrawal, Suri. Medians and beyond: New aggregation techniques for sensor networks.
Nath, Gibbons, Anderson, Seshan. Synopsis diffusion for robust aggregation in sensor networks.
Patt-Shamir. A note on efficient aggregate queries in sensor networks.
Angluin, Aspnes, Diamadi, Fischer, Peralta. Computation in networks of passively mobile finite-state sensors.
Angluin, Aspnes, Chan, Fischer, Jiang, Peralta. Stably computable properties of network graphs.
Homework 6b handed out

Class 25 (Monday, May 15): Seth Gilbert, Tina Nolte
Applications: Implementing atomic memory: Lynch, Shvartsman. RAMBO: A reconfigurable atomic memory service for dynamic networks.
Gilbert, Lynch, Shvartsman, RAMBO II: Rapidly reconfigurable atomic memory for dynamic networks.
Dolev, Gilbert, Lynch, Shvartsman, Welch. GeoQuorums: Implementing atomic memory in ad hoc networks.
Tracking: Demirbas, Nolte, Arora, Lynch. Stalk: A self-stabilizing hierarchical tracking service for sensor networks.

Class 26 (Wednesday, May 17): Tina Nolte, Rachid Guerraoui
Applications: Robot motion control: Walter, Welch, Amato. Distributed reconfiguration of metamorphic robot chains.
Defago, Konagaya. Circle formation for oblivious anonymous mobile robots with no common sense of orientation.
Flocchini, Prencipe, Santoro, Widmayer.
Gathering of autonomous mobile robots with limited visibility.
Lynch, Mitra, Nolte. Motion coordination using virtual nodes.
Intelligent highways:
Sun, Garcia-Molina. Using ad-hoc inter-vehicle network for regional alerts.
Kan, Pande, Vinograd, Garcia-Molina, Event Dissemination in High Mobility Ad-hoc Networks.
Homework 6 due