Course Description

- An advanced course in wireless networks that examines various topics dealing with:
  - Wireless Cellular Networks (10%)
  - Wireless Ad hoc networks (60%)
  - Wireless Sensor networks (30%)
Course Topics – Cellular, Ad hoc & Sensor Networks (1)

- Basics of wireless networks (10%)
- Cellular networks – 1-3 Generation Networks (10%)
- Media access control in ad hoc & sensor networks (10%)
  - Performance, Fairness, Directional Antennas
  - MACA, MACAW, PAMAS, FAMA etc.
- Unicast Routing Protocols (15%)
  - DSDV - Distance Sequence Distance Vector Routing
  - AODV - Ad hoc On Demand Distance Vector Routing
  - DSR - Dynamic Source Routing Protocols
Course Topics – Cellular, Ad hoc & Sensor Networks (2)

- Power Aware Routing Protocols – Several schemes
- Multi-path Routing – Several Schemes
- Hierarchical/Clustering Routing
- Location Aided Routing

- Multicast Routing (5%)
  - Multicast AODV - MAODV
  - On-Demand Multicast Routing Protocol (ODMRP)
  - Geocasting
Course Topics – Cellular, Ad hoc & Sensor Networks (3)

- Transport layer for Ad hoc Networks (10%)
- Energy issues in Ad hoc and Sensor networks (10%)
  - Scheduling
  - Media access control
  - Special hardware
- Security threats to ad hoc networks and proposed solutions (10%)
  - Secure Routing Protocols (several)
  - Secure Transport Protocols
  - Intrusion detection
Course Topics - Cellular, Ad hoc & Sensor Networks (4)

- Introduction to sensor networks (10%)
- QoS and other topics (10%)
Learning Objectives (1)

Upon successful completion of this course, you will be able to ...

- Explain the constraints of the wireless physical layer that affect the design and performance of ad hoc and sensor networks, protocols, and applications;
- Explain the performance of various unicast and multicast routing protocols that have been proposed for ad hoc networks;
- Explain the operation of several media access protocols that have been proposed for ad hoc and sensor networks;
Learning Objectives (2)

Upon successful completion of this course, you will be able to (continued) ...

- describe the platform architectures that are suitable for mobile computing and communications specially for sensor networks;
- Explain the energy issues in sensor networks and how they can be addressed using scheduling, media access control, and special hardware;
- Explain various security threats to ad hoc networks and describe proposed solutions.
Learning Objectives (3)

- Upon successful completion of this course, you will be able to (continued)...
  - Sharpen the paper presentation skills
Textbook

- There several excellent books, you may choose any one that you like
  5. Several others

- Buying of any book is not mandatory as most of the material will come from papers and other books, handbooks etc.
Class Web Site

- Address:
  - [http://www.cs.jhu.edu/~cs647](http://www.cs.jhu.edu/~cs647)
  - Announcements (check regularly!)
  - Course information (syllabus)
  - Staff information
  - Course documents (lecture notes, etc.)
  - External links (useful links) - to hundreds of important research papers and pointers to other resources
Class ListServ

- A ListServ will be used for special instructor-to-student announcements and general group discussion

- **To Join:**
  Send email to majordomo@cs.jhu.edu with "subscribe cs647" in the message BODY.

- **To Post a Message:**
  Send email to cs647@cs.jhu.edu

- Email to the instructor should be limited to private correspondence
Additional Resources (1)

- IETF MANET Working Group,
- Proceedings of IEEE, vol. 75, no. 1, Jan 1987
- Recent Ad hoc networks special issues from
  - IEEE JSAC, Vol. 17, no. 8, Aug 1999
Additional Resources (2)

- Recent Ad hoc networks special issues from (contd.)
  - IEEE Communications Magazine, Vol. 39, no. 6, Jun 2001,
  - Some more to come

- Proceedings of Mobicom, Mobihoc, Sigcomm, Infocom, Globecom, ICC, WCNC, ICCCN etc.
Additional Resources (3)

- URLs for several research groups
  - http://www.cs.ucla.edu/NRL/wireless/
  - http://lecs.cs.ucla.edu/
  - http://wind.lcs.mit.edu/
  - http://www.cse.ucsc.edu/research/ccrg
  - http://mosquitonet.stanford.edu/
  - http://www.monarch.cs.cmu.edu/
  - http://timely.crhc.uiuc.edu/
  - http://www.crhc.uiuc.edu/~nhv
Assignments

- No Home Works
- No Mid Term Exam
- No Final Exam
- Paper Presentation - Three times during the semester
  - 1st presentation during 6-7th week of classes
  - 2nd presentation during 9-10th week of classes
  - 3rd presentation during 12-13th week of classes
- Each presentation will require presenting one to two research papers in class
  - More information will be coming later in the semester
Paper Presentation

- Choose one to two papers from the class website or other approved sources such as IEEE/ACM journals and conference proceedings
- Papers need to be approved by the instructors
- Present the paper to the class in 30-35 minutes
- Answer questions from the class and the instructors
Overall Course Grade

<table>
<thead>
<tr>
<th>Paper presentation (3 @ 27% each)</th>
<th>80%</th>
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<tbody>
<tr>
<td>Attendance &amp; Participation</td>
<td>20%</td>
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Grading: General Policies

- Your grade for presentation will depend on:
  1. Articulation of the problem statement
  2. Presentation of background material
  3. Accurate description of the main research contained in the paper
  4. Discussion of the major results and findings
  5. Clarity of presentation

- Additional criteria to be announced
Special Needs

- Please feel free to meet with or otherwise contact the instructor if you have any special needs
Instructor Contact Information

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- Telephone: (410)-516-5298
- Office hours: 2-3 PM MW or by appointment