

CIS 5636 Ad Hoc Networks

● Course Description:

Ad Hoc Networks. Credit 3. A comprehensive approach to fundamentals of ad hoc networks including media access protocols, routing protocols, implementation and communication performance. Prerequisite: Discrete Mathematics and Introduction to Data Communications.

● Textbook:

J. Wu, Theoretical and Algorithmic Aspects of Sensor, Ad Hoc Wireless, and Peer-to-Peer Networks, CRC Press, 2005.

Classnotes and handouts

● References:

S. Basagni, M. Conti, S. Giordano, and I. Stojmenovic, Mobile Ad Hoc Networking, IEEE Press, 2004.

C. Siva Ram Murthy and B. S. Manoj, Ad Hoc Wireless Networks: Architectures and Protocols, Prentice Hall, 2004.

M. Ilyas, The Handbook of Ad Hoc Wireless Networks, CRC Press, 2002.

I. Stojmenovic, Handbook of Wireless Networks and Mobile Computing, John Wiley & Sons, 2002

C.E. Perkins, Ad Hoc Networking, Addison Wesley, 2001.

D. P. Agrawal and Q.-A. Zeng, Introduction to Wireless and Mobile Systems, Thomson Brooks/Cole, 2003.

D. Wagner and R. Wattenhofer (Eds), Algorithms for Sensor and Ad Hoc Networks, Springer, 2007

Conference proceedings: INFOCOM, MobiCom, MobiHoc and SenSys

● **Instructors:**

Jie Wu, Laura H. Carnell Professor
354 SERC, 215-204-8450, jiewu@temple.edu

● **Office Hours:**

Wu: Tuesday, 3:00 – 5:00 pm

● **Goals:**

An understanding of basic of the ad hoc wireless networking. Covers media access, routing, data management, power optimization, transport protocol, and much more.

Current and future developments in the field.

● **Prerequisites by Topics:**

1. Basic graph theory
2. Fundamentals of computer networks

● **Topics:**

1. Introduction to Wireless Networks
2. Ad Hoc Wireless Networks and Their Origins
3. Topics in Infrastructured Networks (3G and 4G)
 - Handoffs
 - Location Management and Localization Service
 - Channel Assignment
 - Cognitive Radio
4. Topics in Infrastructurless Networks (MANETs)

- Wireless Media Access Protocols
 - Ad Hoc Routing Protocols
 - Multicasting and Broadcasting
 - Information Propagation
 - Data collection, aggregation, and compressive sensing
 - Coverage, Reliability, and QoS
 - Power Optimization
 - Capacity
 - Security - Network Coding

5. Applications

- Sensor Networks and IoTs
- Pervasive Computing
- Delay Tolerant Networks
- Social Networks
- Vehicular Networks

6. Sample On-going Projects

- **Grading Policy:**

- Midterm: 25%
- Final: 25%
- Homework: 30%
- Project: 20%