CIS 9590 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. Giordando, 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.

Conference proceedings:INFOCOM, MobiCom, MobiHoc and SenSys

- **Instructors**:

Jie Wu, Chair and Laura H. Carnell Professor

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- **Office Hours:**

Wu: Tuesday, 3:00 – 5:00 pm; Tang: Thursday, 2:00 – 4:00 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 Indoor Wireless Environments
       - Pervasive Computing
       - Peer-to-Peer Networks
       - Delay Tolerant Networks
       - Social Networks
  6. Sample On-going Projects