1. Instructor
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2. Course Objectives
This is a graduate level course emphasizing research in wireless networking area with an emphasis on ad hoc & sensor networks. This course is structured slightly differently. There will be regular lectures throughout the semester except for couple of weeks during which students will be presenting papers chosen from the list of published papers available via course website. The course examines wireless cellular, ad hoc and sensor networks, covering topics such as wireless communication fundamentals, medium access control, network and transport protocols, unicast and multicast routing algorithms, mobility and its impact on routing protocols, application performance, quality of service guarantees, and security. Energy efficiency and the role of hardware and software architectures may also be presented for sensor networks. Upon completion of this course, it is envisaged that the students will be able to:

a) Explain the constraints of the wireless physical layer that affect the design and performance of ad hoc and sensor networks, protocols, and applications;
b) Explain the performance of various unicast and multicast routing protocols that have been proposed for ad hoc networks;
c) Explain the operation of several media access protocols that have been proposed for ad hoc and sensor networks;
d) Describe the routing architectures that are suitable for Ad hoc Network communications;
e) Explain the energy issues in sensor networks and how they can be addressed using scheduling, media access control, and special hardware;
f) Explain various security threats to ad hoc networks and describe proposed solutions.

3. Prerequisites
You must have a good understanding of computer networks, including wireless networks with multiple access networks, routing and network protocols, including the TCP/IP suite, and computer algorithms. B.Tech students must have scored 7.4.

5. Resources
- There is no required text. Several texts have appeared such as (1) Ad hoc Networks – Theory and Applications, C. DeMorais and D. P. Agrawal, World Scientific Publishing, New Jersey (ISBN – 978-981-256-682-9): (2), Ad Hoc Mobile Wireless Networks, C. K. Toh, Prentice Hall, 2002 and (3) Ad Hoc Wireless Networks - Architectures and Protocols, C.Siva Ram Murthy and B.S.Manoj., Prentice Hall, 2004 and several others. Buying of any textbook is not mandatory as most of the material will come from papers and other resources etc.
- Additional books, papers and documents, such as IETF RFCs, will be used to cover other topics. Some of these will be available via the folder file.
• All students are required to have email and World Wide Web access. Lecture notes, assignments, etc. will be available in Lecture folder

6. Grading

Grades will be based on the following weights.

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<tr>
<th>Component</th>
<th>Weight</th>
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<tr>
<td>Three Research paper presentation</td>
<td>80%</td>
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<tr>
<td>Interactions</td>
<td>20%</td>
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7. Assignments

Homework - None

Mid-term Examination - None

Final Examination - None

Research Paper Presentation. You will be making three presentations to the class during the regular class hours in the semester. For each presentation you need to choose one to two papers from the Lecture folder of class or from any other valid source such as IEEE/ACM journals and/or conference proceedings. The first presentation needs to take place during 6th or 7th week of classes. The dates for the second/third presentations will be announced later in the class. It is required that you inform the instructor which papers you have chosen for the presentation and seek approval. The guidelines describing the format of the paper presentation and its duration will be available later in the semester via class folder. It is expected that every student will choose different set of papers. Same paper cannot be chosen by two students. Grades will be based on clarity of presentation, understanding of the key concepts, describing the research contained in the papers, and answering the questions from the audience. There will no teaming opportunities in this course.

8. Special Needs or Circumstances

Please feel free to meet with or otherwise contact the instructor if you have any special needs.

9. Course Topics

• Basics of wireless networks and mobile computing (10%)
• Media access control in ad hoc and sensor networks (10%)
• Network and transport layer issues for ad hoc and sensor networks (5%)
• Routing protocols – unicast and multicast (20%)
• Transport layer protocols (10%)
• QoS for ad hoc networks (5%)
• Security issues for ad hoc networks (10%)
• Energy issues (10%)
• Sensor networks (10%)
• Others (10%)