

Wireless Ad Hoc and Sensor Networks

Course Information

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ECSE, RPI
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Registration Information

- **Course title**
 - Wireless Ad Hoc Networks
- **Course Number**
 - ECSE6962
- **Course Credit**
 - 3 graded credits
- **Instructor**
 - Alhussein Abouzeid
- **TA**
 - Jingqiao Zhang

Administrative Information

- **Class meeting**

- Time: MR 4:00-5:20 pm
- Room: JEC4304

- **Office Hours**

- AA:

- By appointment
- Tel: x6534; email: abouza@rpi

- JZ:

- TBA

Course Web Page

- <http://www.ecse.rpi.edu/Homepages/aboutzeid/monet.html>
- **Download Course Material**
 - Lecture Slides
 - Reading Lists
 - Homework Assignments

Pre-requisites

- **Research-oriented course**
 - A term project accounts to half the grade
- **Pre-requisites**
 - An undergraduate course in computer networks, equivalent to CCN (ECSE-4670)
 - Students may also take this course together with ECSE-4670.
 - Undergraduate students may take this course after getting the permission of the instructor.

Course Goals

- This is an advanced networking course. It is designed for students with computer networks background
- Goals
 - Provide students with a broad perspective on the active research areas in wireless ad hoc and sensor networks
 - Lead students toward exploring and expanding their research experiences
 - →The expectation is an interesting demo and/or a short conference/workshop paper by the end of this course.

Course Material

- **No need to buy text-books**
 - Selected chapters will be distributed in class as necessary
 - Reading list, which will include
 - Journal and conference articles from IEEE & ACM
 - Reports from various research centers and agencies
 - Supplementary reading list
 - Recommended for interested students
 - Lecture Slides

Course Dynamics

■ Lectures

■ By the instructor

- This will include theory, fundamental information etc. but will typically not be good topics for debates

■ By the students

- This will include focused surveys on selected proposals or technologies, typically open for debate.
- Each student presents a lecture based on recommended readings by the instructor
- Student lecture readings will be posted around 2-3 weeks in advance.
- Each student must get approval on the slides by the instructor one week in advance. The student also needs to make 2-3 problems based on the readings.

■ By invited speakers

- We will have a couple of lectures by invited speakers – will be announced later.

■ Term Project

■ Goal

- To experience the process of identifying and solving a research problem
- Learn and improve technical writing skills
- Learn and improve presentation skills

■ Practical/Implementation-oriented

- Feel free to use the hardware available for this course, including several sensor nodes

■ Simulation-based

- Either utilizing open-source simulation tools (e.g. ns-2, Glomosim, etc.) or writing your own code
 - Linux platform preferred unless there is a specific reason not to use it

■ Mathematically-oriented

- This may include the application of a theory towards design, optimization, modeling, etc.

■ The project involves

- A pre-proposal discussion with me, including the names of groups (2-3 students/project)
- A formal proposal write-up and discussion
- A final proposal presentation (last week) and peer grading
- A final report (and, if applicable, demo)

Grading Policy (4 components)

- **Project: 50%**
 - (see previous slides for details)
 - Note: Literature surveys unacceptable
 - It is possible that risky or ambitious ideas may not lead to results - what matters is the quality (not quantity) of your effort and your approach
- **Homework assignments (around 4): 20%**
 - Some of the homework problems will include ones made by the student lectures
- **Individual student reading-based lecture: 20%**
 - Lecture slides must be pre-approved by the instructor one week in advance
 - Student must be prepared to answer the questions that might (and will) come up during the talk
 - Every student gives one (and only one) lecture (no make-ups)
 - Grading criteria:
 - **Grading Criteria for Student Presentations Total (0-100)**
 - Critical thinking (0-30): identify discrepancies, research holes, and potential improvements of the work
 - Vision and related work (0-30): Compare and relate the work to other works
 - Presentaion (0-20): Stress and illustrate key ideas of the work, e.g., with examples and figures; clarity in delivery
 - Knowledge (0-20): The depth and breadth of knowledge of the presented material
- **Class debates: 10%**
 - you need to read in order to effectively debate
 - The grade is assigned by the instructor during class

Standard Notes

■ Academic Honesty

- Please read about what constitutes academic dishonesty e.g.
 - Failure to cite references
 - Making up results
 - Stealing ideas but presenting them differently
 - Others
- Penalty for dishonesty
 - Depends on severity, but could vary including any or all of the following:
 - 0 score
 - reduction in grade by one level
 - F in the course + reporting to the dean

■ Late Policy

- 20% off per day, except with prior instructor approval

Syllabus

- The syllabus could be described along three different dimensions, as follows:
- A- Algorithms and applications:
 - Ad Hoc and Sensor networks applications
 - Medium Access Control
 - Routing and Data Aggregation
 - Mobile Computing
 - Data Transport

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- **B- Design and analysis approaches:**
 - Layered approach to networking design
 - Cross-layer design
 - Optimization
 - Information theory
 - Control theory

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- C- Industry and real-life examples
 - USGS Earthquake Hazards program
 - Zebranet
 - Motes and non-Motes
 - Architectural and Hardware design issues

Previous Offerings

- **Homepage of previous offerings** (this year content and dynamics are rather different from previous years, so please use just as a preview to get a general idea about the content):
 - 2004:
<http://www.ecse.rpi.edu/homepages/abouzeid/6962-04/6962-04.html>
 - 2003:
<http://www.ecse.rpi.edu/homepages/abouzeid/6962-03.html>
 - 2002:
<http://www.ecse.rpi.edu/homepages/abouzeid/ECSE6962/monet.html>

Motivating Example: Students in a classroom

(discussion)