ECE6615: Sensor Networks
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MIDTERM EXAM: MARCH 15, 2011

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*** PUT A CODEWORD NEXT TO YOUR NAME!!!**
*** THIS IS AN OPEN BOOK EXAM (EVERYTHING ALLOWED EXCEPT LAPTOPS AND CELL PHONES)**
*** DURATION 75 MINUTES**
*** ANSWER THE QUESTIONS RIGHT TO THE POINT;**
*** AVOID LONG EXPLANATIONS; COUPLE SENTENCES WILL BE ENOUGH AS LONG AS THEY ARE CORRECT!!**

QUESTION 1. (20 points; 5 points each question)

a) **What is the problem of using sensor networks in 2.4 GHz spectrum band?**
b) **Dynamic Voltage Scaling can help us to save energy? What is the downside of it?**
c) **Why is there no closed form solution for energy consumption in case of sensing?**
d) **Why can't we use solar cells for sensors and solve the power problem for good?**

QUESTION 2. (20 points; 5 points each question)

a) **Where was the RMST basic idea taken from? In other words, for which networks was this idea used before?**
b) **What is the difference (one major difference) between ESRT and GARUDA?**
c) **Would you use PSFQ and CODA together or not? Why?**
d) **Can ESRT be used for classical wireless multi-hop (ad hoc) networks? Why?**

QUESTION 3: (30 points; 5 points each question)

a) **How is the addressing problem solved in sensor networks?**
b) **Why would you not use Directed Diffusion algorithm for mobile sensor networks?**
c) **What is your criticism of the THRESHOLD FORMULA of the LEACH algorithm?**
d) **What MAC protocol would you use with LEACH? Why?**
e) **What are the limitations of Geographical Routing algorithms?**
f) **Why was a heuristic algorithm, PRADA, developed after the Partial Knowledge Forwarding algorithm?**

QUESTION 4. (30 points; 5 points each question)

a) **What are the 2 differences between SMAC and BMAC?**
b) **How is Preamble Sampling implemented on latest and first generation sensor devices?**
c) **Why do we need to calculate r_{corr} when we use CCMAC?**
d) **What does the BITMAP help us when TRAMA used?**
e) **Why is LOCAL FRAME CONCEPT introduced in Z-MAC?**
f) **How are CSMA and TDMA MACs combined in Z-MAC?**