

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

COMPUTER ENGINEERING DEPARTMENT

COE 549: Wireless Sensor Networks Term 131 (Fall 2013)

Syllabus

Instructor: Dr. Abdulaziz Barnawi

Lecture: M.W.: 8:00-9:15PM

Class location: Bldg 24 Room 135

Office hours: M.W.: 3:00-4:00 PM (in 22/407-4), T.: 11:00-11:50AM (in 59/2065), or by appointment

Office-Tel: 1038

Web site: <http://faculty.kfupm.edu.sa/coe/barnawi>

e-mail: Only Blackboard's email will be used for correspondence during this course.

Course Description:

Advanced development in **wireless communication technologies** as well as an increasing interest in applications that involve environment monitoring and control (e.g. wildfire and habitat monitoring, structural control, health care and target tracking in military systems) has led to the emergence of a new kind of wireless networks, namely wireless sensor networks. The objective of this course is to introduce students to the state of the art in wireless sensor actuator networks. Lectures will emphasize aspects of energy management, MAC protocols, routing and data aggregation, localization. Case studies from existing applications will be used.

Prerequisite: Undergraduate level in computer networking and data communication

Textbook:

There is no specific textbook assigned for this course. The following book is used to prepare for lecture slides:

- ***Protocols and Architectures for Wireless Sensor Networks*** by Holger Karl and Andreas Willig, Wiley, ISBN: 0-470-09510-5, June 2005

The following books are also recommended as a supporting reading material:

- ***Wireless Sensor Networks***, by Ian F. Akyildiz and Mehmet Can Vuran, John Wiley & Sons 2010, ISBN 978-0-470-03601-3
- ***Wireless Sensor Networks***, by Suraiya Tarannum, ISBN 978-953-307-325-5, Hardcover, 342 pages, Publisher: InTech.
- ***Ad hoc Wireless Networks – Architecture and Protocols***, by C. Siva Ram Murthy and B. S. Manoj, , Prentice Hall, 2004, ISBN – 013-147-023x.

Tentative Grading Policy:

Class participation	10%
Reading-list presentations	20%
Project	50%
Final	20%

Important Policies:

- All KFUPM regulations and standards will be enforced. Attendance will be checked each class.
- You have 48 hours to object to the grade of a presentation or assignments from the end of the class time in which the graded submissions have been distributed back.
- Check the course webpage and Blackboard for updates, emails and announcements.
- Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated.

Expected Learning Outcomes

Upon successful completion of this course:

1. Students will be introduced to some existing applications of wireless sensor actuator networks.
2. Students will be introduced to elements of network protocol design and will learn to apply these principles in the context of wireless sensor networks
3. Students will learn the various hardware, software platforms that exist for sensor networks
4. Students will get an overview of the various network level protocols for MAC, routing, time synchronization, aggregation.
5. Students will read and present seminal papers on various issues in sensor networks, opening a path to research in this area
6. Students will understand what research problems sensor networks pose in disciplines such as signal processing, wireless communications and even control systems

Tentative Class and Lab Schedule

Week	Lecture	Date	Topic
1	1	September 2, 2013	Logistics and introduction
	2	September 4, 2013	Sensor node architecture
2	3	September 9, 2013	Power and Energy Management
	4	September 11, 2013	Basics of Wireless Communications
3	5	September 16, 2013	Sensor Network Architecture
	6	September 18, 2013	<i>Reading Assignment 1 (A1)</i>
4	7	September 23, 2013	National Day – No Class
	8	September 25, 2013	<i>Reading Assignment 2 (A2)</i>
5	9	September 30, 2013	Network Bootstrapping and Clustering
	10	October 2, 2013	MAC Protocols for Sensor Networks
6	11	October 7, 2013	MAC Protocols for Sensor Networks (cont.)
	12	October 9, 2013	<i>Reading Assignment 3 (A3) / Project proposal submission starts</i>
Hajj Holiday 11-20 October, 2013			
7	13	October 21, 2013	<i>Reading Assignment 4 (A4) / Project proposal submission deadline</i>
	14	October 23, 2013	<i>Invited Speaker</i>
8	15	October 28, 2013	Project proposal presentations
	16	October 30, 2013	Project proposal presentations
9	17	November 4, 2013	Routing and Data Aggregation
	18	November 6, 2013	Reading Assignment 5 (A5)
10	19	November 11, 2013	Reading Assignment 6 (A6)
	20	November 13, 2013	<i>Invited Speaker</i>
11	21	November 18, 2013	Reading Assignment 7 (A7)
	22	November 20, 2013	Reading Assignment 8 (A8)
12	23	November 25, 2013	Cross Layer Design
	24	November 27, 2013	Reading Assignment 9 (A9)
13	25	December 2, 2013	Reading Assignment 10 (A10)
	26	December 4, 2013	Project Presentations
14	27	December 9, 2013	Project Presentations
	28	December 11, 2013	Project Presentations
15	29	December 16, 2013	Project Presentations
	30	December 18, 2013	Project Presentations