COURSE INFORMATION
TLEN5520/ECEN5032 - Wireless Local Area Networks

Course Description:
This course is a comprehensive examination of wireless local area networks, with an emphasis on the IEEE P802.11 family of WLAN standards. Students will learn the legacy versions of the standard (802.11b/ds), the current generation of WLAN systems (802.11a/g/n), and will have an opportunity to analyze and critique upcoming versions (802.11ac/ad/af/ah), as well as gain insight into proposals for new research in WLAN, such as indoor location. Students will also get exposure to the interoperability and certification process for WLAN as implemented by the Wi-Fi Alliance, study the newest Wi-Fi Certified™ programs, and will learn how to model and analyze WLAN traffic using industry standard tools. Working documents from 802.11 Task Groups will be evaluated as student projects in the course.

Prerequisites:
A graduate course in data networking such as: TLEN 5330 Data Communication I, CSCI 5273 Network Systems, or ECEN 5032 Communication Networks. Questions and waivers to this requirement should be directed to the instructor.

Instructor:
Dr. Jim Lansford
Adjunct Professor
james.lansford@colorado.edu
719-286-9277 (m) {I may not be able to answer my mobile while travelling.}

Course Homepage:
On CULearn (in process)

SA:
TBD

Office hours and location
Office: ECOT 341
Office hours: 2:30-4:30 Monday & Wednesday (after class)
Other times by appointment (phone) – you can also send me an email.
I work in several wireless standards defining organizations, so I will have to miss a couple of weeks of class this semester to attend standards meetings; I'll be available as much as my schedule permits. I will check email at least once a day, so let me know if you have any questions or concerns- thanks in advance for your patience.

Grading:
Midterm exam 30%
Final exam 30%
Project 30%
Homework 10%

(No late homework, please. Late homework will be accepted only under exceptional circumstances. In most cases, it's better to turn in incomplete homework rather than to turn in a late assignment.)
Books (Recommended):
- Stallings, Wireless Communications & Networks, 2nd edition
- Numerous articles will be uploaded to CULearn.

Lab exercises:
TBD

Class outline:
1/14/2013 Review of Wireless Communication
1/16/2013 Review of Wireless Communication
1/21/2013 No class - holiday
1/23/2013 Propagation and Channel Models
1/28/2013 Channel models and channel access
1/30/2013 Modulation: single carrier and OFDM
2/4/2013 Advanced OFDM and MIMO
2/6/2013 Evolution of WLAN: ALOHA and other protocols
2/11/2013 The OSI model: Impacts of wireless on traditional networking stacks
2/13/2013 The early WLAN standards: 802.11FH/DS and 802.11b
2/18/2013 The Current WLAN standards: 802.11a/g/n – Part 1
2/20/2013 The Current WLAN standards: 802.11a/g/n – Part 2
2/25/2013 Analyzing and modeling WLAN traffic
2/27/2013 The Wi-Fi Alliance: Interoperability, certification…and now much more
3/4/2013 WLAN Security Part 1
3/6/2013 WLAN Security Part 2
3/11/2013 Cracking WEP: Why WEP was a flawed encryption standard and how to crack it
3/13/2013 Midterm exam
3/18/2013 Integration of WLAN into an enterprise network: Lightweight APs and Controllers
3/20/2013 Issues in WLAN and WWAN (cellular) interworking - using Wi-Fi for cellular offload
3/25/2013 No class - Spring Break
3/27/2013 No class - Spring Break
4/1/2013 The next generation of WLAN - Part 1: 802.11ac
4/3/2013 The next generation of WLAN - Part 2: 802.11ad
4/8/2013 The next generation of WLAN - Part 3: 802.11af
4/10/2013 The next generation of WLAN - Part 4: 802.11ah
4/15/2013 The emergence of Wi-Fi Alliance Standards: Wi-Fi Direct
4/17/2013 Wi-Fi Display: Miracast
4/22/2013 Mesh networking and Wi-Fi Sensor Networks
4/24/2013  Other Wi-Fi topics: Service Discovery, Wi-Fi Serial Bus, and Hotspot 2.0
5/1/2013  Emerging trends: Wi-Fi Location and Wi-Fi PAN
TBA  Final Exam

These dates are tentative and subject to change. I am also working to arrange a couple of guest speakers from industry, and will modify the syllabus as needed if we have a guest speaker.

Additional Information:

1) If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Injuries under Quick Links at Disability Services website and discuss your needs with your professor.

2) Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, if you believe there may be a potential conflict with exams or assignments due to religious obligations, please contact the instructor. See full details at http://www.colorado.edu/policies/fac_relig.html

3) Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran’s status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at http://www.colorado.edu/policies/classbehavior.html and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

4) The University of Colorado Boulder (CU-Boulder) is committed to maintaining a positive learning, working, and living environment. The University of Colorado does not discriminate on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status in admission and access to, and treatment and employment in, its educational programs and activities. (Regent Law, Article 10, amended 11/8/2001). CU-Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, or veteran status. Individuals who believe they have been discriminated against should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at http://hr.colorado.edu/dh/

5) All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at http://www.colorado.edu/policies/honor.html and at http://honorcode.colorado.edu