

Fall 2008 New Course -- Syllabus
ECEN 489-501 – Special Topics in
Computer & Wireless Communications Networks

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Class Times: Tuesday & Thursday 05:30PM-06:45PM
Class Room: 223C ZACH

Prerequisite:

As a multi-disciplinary class, this course will be open to all junior and senior (also, 1st year graduate) engineering or the other students who are interested in computer & wireless communications networks. The desirable prerequisites for the course are basic knowledge of computer programming and elementary calculus or instructor consent.

Frequency: This course will be offered twice a week with 75 minutes long lecture in each class.

Course Descriptions:

The world is surging toward an information networks revolution where wired and wireless computer networks mediate every aspect of modern life, from paying bills to buying real estate, from reading a book to watching a film, and from accessing Internet via desktop computer in office to browsing websites through laptop/portable-device on the wheels. The goal of this course is to introduce the engineering students to what lies at the foundation of wired and wireless computer networks, how they are designed and built up, and how well they perform. These are becoming the must-to-know knowledge and techniques for virtually all engineering or the other students before they graduate and join job markets. Such course will definitely make them better educated and more competitive in America's future workforce. We anticipate a broad interest in the course all across the engineering school, including Electrical, Computer, Mechanical, Industrial, and Systems Engineering Departments. Different from most similar courses offered in other U.S. universities, the main unique features of this course include: (1) emphasize the wired & wireless computer networks as a hybrid system to reflect the current trends of modern communications network architectures and techniques, instead of treating the wired networks and wireless networks separately; (2) focus on both network architecture design and rigorous mathematical modeling techniques for performance analyses, rather than mainly on the network protocols specifications; (3) integrate results of instructor's research and emerging techniques into the course topics to motivate students' research interests, not confined to traditional techniques.

Tentative course topics include but not limited to:

- 1) Network architecture, layered protocols: Internet TCP/IP, hybrid wired & wireless networks:
- 2) Digital data transmission over wired/wireless links & wireless communications channel models:
- 3) Reliable communications techniques & channel coding over wired & wireless links:

- 4) Multiple access control over wired/wireless networks, IEEE 802 spectrum & MAC protocols:
- 5) Network topology, packet switching architectures, packet routing algorithms, fair queuing:
- 6) Internet protocol stack: wireline TCP/UDP/IP, wireless TCP, window-based vs. rate-based:
- 7) Network queuing-delay/loss modeling for performance analyses in quality of service (QoS):
- 8) IEEE 802.11 protocol spectrum, MAC and DCF/PCF, and interconnections with Internet:
- 9) Next generation wired and wireless networks – QoS provisions for multimedia streaming:

Grading Policy:

Examinations: One Midterm Exam (25%);

One Final Exam (30%)

Other Assignments: Homework (20%),

Projects (25%)

Course text books:

I will use multiple books as references for this course. A partial list of references is listed below. Handouts and journal papers will also be distributed to serve as course references.

- 1) “Data networks”, by Dimitri Bertsekas & Robert Gallager, Prentice Hall Publishers, 2nd Edition
- 2) “Mobile communication” by Gordon L. Stuber, Kluwer Academic Publishers, 2nd Edition
- 3) “Communication networks, fundamental concepts and key architectures”, by Leon-Garcia & Widjaja, McGraw Hill Publishers, 2nd Edition
- 4) “Wireless communications and networks”, by William Stallings, Prentice Hall Publishers, 2nd Edition

Americans with Disabilities Act (ADA) Policy Statement

The following ADA Policy Statement (part of the Policy on Individual Disabling Conditions) was submitted to the University Curriculum Committee by the Department of Student Life. The policy statement was forwarded to the Faculty Senate for information. The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room B118 of Cain Hall or call 845-1637.

Academic Integrity Statement

Aggie Honor Code

“An Aggie does not lie, cheat, or steal or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: www.tamu.edu/aggiehonor/

On all course work, assignments, and examinations at Texas A&M University, the following Honor Pledge shall be preprinted and signed by the student:

“On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work.”