CS4331/5331: Wireless Networks and Mobile Computing
Summer II 2020

- Instructor: Sunho Lim (Ph.D., Assistant Professor)
- Office: 310 Engineering Center
- Phone: (806) 742-3527
- Email: sunho.lim@ttu.edu

- Course meetings: M/T/W/R/F, 12:00 PM – 1:50 PM, 132 Mechanical Engineering North
- Tentative office hours: M/W, 2:00 PM – 3:00 PM, or by appointment
- Course web page: TTU Blackboard

Course Description:

- This course will cover basic techniques in wireless networks and mobile computing and their corresponding algorithms and communication protocols embedded in the link, network, transport, and application layers. Key topics addressed include but not limited to overview of wireless/mobile networks, signals, routing protocols, medium access control, *-Cast, mobility, and recent research issues. Students are required to read a set of technical papers published in recent conferences and journals and summarize/present the papers. **Prerequisite:** Good background in Computer Science, good programming skill (C or C++), or permission from the instructor

Course Objectives:

- The primary objective of this course is to introduce students the cutting-edge technologies and have them initiate research in the areas of wireless networks and mobile computing.

Learning Outcomes: Upon completion of this course, students will be able to,

- Undergraduate students:
  - Explain and compare basic types of wireless/mobile networks
  - Understand basic wireless/mobile algorithms and communication protocols
  - Understand a research issue
- Graduate students:
  - Explain, compare, and analyze basic types of wireless/mobile networks and their variants
  - Understand and analyze basic wireless/mobile algorithms and communication protocols
  - Identify, analyze, and conduct a research issue

Textbook:

- There is no required textbook but a couple of reference books and list of technical papers will be used.
- Important concepts/materials will be included in the lecture notes from various sources.

References:

- Mobile Communications, by John Schiller, 2nd Edition, 2005, Addison-Wesley
- Wireless Communications & Networks, by William Stallings, 2nd Edition, 2005, Prentice Hall
- Computer Networking – A Top-Down Approach Featuring the Internet, by J. F. Kurose and K. W. Ross, 7th Edition, 2017, Pearson
- Technical papers published in recent conferences and journals

Course Schedule: Topics and/or dates may be changed during the semester at the instructor's discretion because of scheduling issues, developments in the discipline, or other contingencies.

- Week 1: Introduction of Wireless/Mobile Networks; The Physical Layer and Signal
- Week 2: The Link Layer; Medium Access Control (MAC) Protocols; IEEE 802.11; Wireless Routing Protocols
- Week 3: Midterm Exam; The Network Layer, Wireless Routing Protocols
- Week 4: *-Cast; Mobility; Variants of Wireless/Mobile Networks
- Week 5: Recent Research Issues: Final Exam

Grading Policy:

- Midterm exam: 20%, **July 20th (Monday)** during the class
- Final exam: 30%, **August 6th (Thursday), 8:00 AM – 10:30 AM** (132 Mechanical Engineering North)
  - Closed book and closed notes. No calculator/smartphone will be permitted. You are required to bring your student ID for the exams; and there will be no make-up exam.
- Quiz/Review: 20%

    - Attendance is highly required. If a student misses a class, the student should not expect individualized instruction what was missed. This will be effective from the beginning of semester.
    - Quiz/Review may not be announced in advance; and there will be no make-up quiz/review.
- Homework/Project: 30%
    - Homework/Project should be turned-in in the beginning of class on the due date. No late homework/project will be accepted.
- Grade:
    - A (90 – 100), B (80 - 89), C (70 - 79), D (60 - 69), and F (0 - 59)

ADA Statement: Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in West Hall or call 806-742-2405.

Academic Integrity Statement: Academic integrity is taking responsibility for one's own class and/or course work, being individually accountable, and demonstrating intellectual honesty and ethical behavior. Academic integrity is a personal choice to abide by the standards of intellectual honesty and responsibility. Because education is a shared effort to achieve learning through the exchange of ideas, students, faculty, and staff have the collective responsibility to build mutual trust and respect. Ethical behavior and independent thought are essential for the highest level of academic achievement, which then must be measured. Academic achievement includes scholarship, teaching, and learning, all of which are shared endeavors. Grades are a device used to quantify the successful accumulation of knowledge through learning. Adhering to the standards of academic integrity ensures grades are earned honestly. Academic integrity is the foundation upon which students, faculty, and staff build their educational and professional careers. [Texas Tech University ("University") Quality Enhancement Plan, Academic Integrity Task Force, 2010]

Religious Holy Day Statement: "Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code §11.20. A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. A student who is excused under section 2 may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

Discrimination, Harassment, and Sexual Violence Statement: Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination of any kind. Sexual assault, discrimination, harassment, and other Title IX violations are not tolerated by the University. Report any incidents to the Office for Student Rights & Resolution, (806)-742-SAFE (7233) or file a report online at titleix.ttu.edu/students. Faculty and staff members at TTU are committed to connecting you to resources on campus. Some of these available resources are: TTU Student Counseling Center, 806-742-3674, https://www.depts.ttu.edu/scc/ (Provides confidential support on campus.) TTU 24-hour Crisis Helpline, 806-742-5555, (Assists students who are experiencing a mental health or interpersonal violence crisis. If you call the helpline, you will speak with a mental health counselor.) Voice of Hope Lubbock Rape Crisis Center, 806-763-7273, voiceofhopelubbock.org (24-hour hotline that provides support for survivors of sexual violence.) The Risk, Intervention, Safety and Education (RISE) Office, 806-742-2110, https://www.depts.ttu.edu/rise/ (Provides a range of resources and support options focused on prevention education and student wellness.) Texas Tech Police Department, 806-742-3931, http://www.depts.ttu.edu/ttpd/ (To report criminal activity that occurs on or near Texas Tech campus.)

Civility in the Classroom Statement: Texas Tech University is a community of faculty, students, and staff that enjoys an expectation of cooperation, professionalism, and civility during the conduct of all forms of university business, including the conduct of student–student and student–faculty interactions in and out of the classroom. Further, the classroom is a setting in which an exchange of ideas and creative thinking should be encouraged and where intellectual growth and development are fostered. Students who disrupt this classroom mission by rude, sarcastic, threatening, abusive or obscene language and/or behavior will be subject to appropriate sanctions according to university policy. Likewise, faculty members are expected to maintain the highest standards of professionalism in all interactions with all constituents of the university (www.depts.ttu.edu/ethics/matadorchallenge/ethicalprinciples.php).

LGBTQIA Support Statement*: I identify as an ally to the lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA) community, and I am available to listen and support you in an affirming manner. I can assist in connecting you with resources on campus to address problems you may face pertaining to sexual orientation and/or gender identity that could

interfere with your success at Texas Tech. Please note that additional resources are available through the Office of LGBTQIA within the Center for Campus Life, Student Union Building Room 201, www.lgbtqia.ttu.edu, 806.742.5433.

*If you prefer to list campus resources rather than a statement about ally status, you might include the following among other campus resources you wish to share:

Office of LGBTQIA, Student Union Building Room 201, www.lgbtqia.ttu.edu, 806.742.5433 within the Center for Campus Life, the Office serves the Texas Tech community through facilitation and leadership of programming and advocacy efforts. This work is aimed at strengthening the lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA) community and sustaining an inclusive campus that welcomes people of all sexual orientations, gender identities, and gender expressions.

Ethical Conduct:

- Cheating will not be tolerated on any work done throughout the semester.
- First offence will result in an F for that assignment and second offence will result in an F in the course. Both offenses must be reported to Student Judicial Programs.
- Cheating is considered to be any collaboration beyond basic discussion for anything unless specifically announced by the instructor. See Statement of Academic Conduct for Engineering Students, College of Engineering, for further information.
- "Students are expected to assist in maintaining a classroom environment that is conducive to learning. In order to assure that all students have the opportunity to gain from time spent in class, unless otherwise approved by the instructor, **students are prohibited from engaging in any form of distraction**. Inappropriate behavior in the classroom shall result, minimally, in a request to leave class."
- **Laptop/electric-device/cell-phone are NOT allowed to use during the class**.