CSCE 5520.001 -- Wireless Networks and Protocols

Instructor Contact

Name: Dr. Asif I Baba
Class Location/Time: NTDP K110, Every Monday 5:30PM – 08:20PM
Office Location: Discovery Park, NTDP E245(E)
Office Hours: M 2PM –5PM, or by appointment
Email: asif.baba@unt.edu

Communication Expectations: This course will use the Canvas learning management system (LMS) to distribute course materials, communicate and collaborate online, post grades, and submit assignments. You are responsible for checking the Canvas course site regularly for class work and announcements. You may find the Online Communication Tips (https://clear.unt.edu/online-communication-tips) helpful. Should you have any questions about the course or material in general, you may attend your instructor’s office hours or use your UNT e-mail address to e-mail your instructor directly at the e-mail address listed above with CSCE 5520.001 in the subject line. Every attempt will be made to answer e-mails within 24 hours, but if no reply is received within this time frame, please follow up with your instructor again to ensure a response.

For assistance with assignments or questions about grading of a particular assignment, you may also contact the IAs/TAs assigned to this course directly via e-mail during their office hours. This information will be available on Canvas.

Grades will be posted on Canvas throughout the semester to provide an ongoing assessment of student progress, but typically about one week after the assignment was due. Grading disputes should first go to the TA/Grader that graded your assignment, but if a resolution cannot be reached between the student and the grader, then you should go to the instructor who will have the final say on the grade.

Welcome to UNT!

As members of the UNT community, we have all made a commitment to be part of an institution that respects and values the identities of the students and employees with whom we interact. UNT does not tolerate identity-based discrimination, harassment, and retaliation. UNT’s full Non-Discrimination Policy can be found in the UNT Policies section of the syllabus.

Course Description

This course introduces fundamental concepts of wireless networks and protocols. The design of wireless networks is influenced heavily by signal propagation, how signals travel through space. The focus of the course is on multi-radio access concepts including CSMA, TDMA/FDMA, and CDMA. It also covers a broad range of wireless networking standards, and reviews important wireless network application areas (e.g., sensor, vehicular, personal networks) and other applications of wireless technologies (e.g., GPS, RFID, sensing, etc.). Finally, we will touch on public policy issues, e.g., as related to spectrum use.
The course will specifically cover:
- Wireless networking challenges
- Wireless communication overview
- Wireless MAC concepts
- Overview of cellular standards, LTE, 4G and 5G
- Overview of wireless MAC protocols Wi-Fi, Bluetooth and personal area networks, etc.
- Wireless in today's Internet: TCP over wireless, mobility, security, etc.
- Advanced topics, e.g., RFIDs, vehicular networks, sensor networks, DTNs, localization, sensing, etc.

Course Structure

Instruction is delivered fully on site. Meeting in NTDP K110 on Monday from 5:30 PM – 08:20 PM, this class is held in person, face to face.

We will be using iClicker Cloud and Canvas to manage in-class quizzes and make the course a more interactive and engaging learning environment. Students are expected to attend class, register with iClicker Cloud, and bring a device (e.g., smartphone, tablet, laptop computer, etc.) for polling responses in this course.

Class Notes and other material

The lecture notes will be made available on Canvas. Additionally, material provided in the class will be available on the CSE servers inside my public directory. Guidelines to access the information will be provided during the class.

Course Objectives

Students who have completed this course should be capable of doing the following:
- Understand the fundamentals of different wireless networks and protocols
- Understand the basic operation of a cellular network
- Understand the basic operation of different network elements of cellular network
- Understand the soft and hard handoff
- Understand the basic issues related to supporting QoS in voice and data services in cellular networks
- Understand the basic operation of cellular networks and interworking of wireless and wireline networks
- Understand the fundamentals of different wireless networks and protocols

Materials

No particular book but handouts in the class when needed. Some reference books listed below:

References:
Teaching Philosophy

I believe that the best way to really learn and understand concepts in computer science is to implement the techniques and perform the operations in an applied manner. While the process of reading examples and proofs in textbooks and lecture notes is valuable, the real learning comes through one’s own efforts in debugging and solving logical and programming problems. I have a very hands-on approach to teaching, which includes coding-on-the-fly and describing how programs work, which typically requires students to be present in the lecture. I would encourage students to use this opportunity to really learn and develop the skills covered in this class that will prepare you for entering a career in industry or furthering your education.

Course Technology & Skills

Minimum Technology Requirements

- Computer
- Reliable internet access
- Plug-ins
- Microsoft Office Suite
- Canvas Technical Requirements (https://clear.unt.edu/supported-technologies/canvas/requirements)

Computer Skills & Digital Literacy

- Using Canvas
- Using email with attachments
- Downloading and installing software
- Using presentation and graphics programs

Technical Assistance

Here at UNT we have a Student Help Desk that you can contact for help with Canvas or other technology issues.

UIT Help Desk: UIT Student Help Desk site (http://www.unt.edu/helpdesk/index.htm)
Email: helpdesk@unt.edu
Phone: 940-565-2324
In Person: Sage Hall, Room 130
Walk-In Availability: 8am-9pm
Telephone Availability:
  - Sunday: noon-midnight
  - Monday-Thursday: 8am-midnight
  - Friday: 8am-8pm
  - Saturday: 9am-5pm
Laptop Checkout: 8am-7pm

For additional support, visit Canvas Technical Help (https://community.canvaslms.com/docs/DOC-10554-4212710328)
Rules of Engagement

Rules of engagement refer to the way students are expected to interact with each other and with their instructors. Here are some general guidelines:

- While the freedom to express yourself is a fundamental human right, any communication that utilizes cruel and derogatory language on the basis of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law will not be tolerated.
- Treat your instructor and classmates with respect in any communication online or face-to-face, even when their opinion differs from your own.
- Ask for and use the correct name and pronouns for your instructor and classmates.
- Speak from personal experiences. Use "I" statements to share thoughts and feelings. Try not to speak on behalf of groups or other individual’s experiences.
- Use your critical thinking skills to challenge other people’s ideas, instead of attacking individuals.
- Avoid using all caps while communicating digitally. This may be interpreted as “YELLING!”
- Be cautious when using humor or sarcasm in emails or discussion posts as tone can be difficult to interpret digitally.
- Avoid using “text-talk” unless explicitly permitted by your instructor.
- Proofread and fact-check your sources.
- Keep in mind that online posts can be permanent, so think first before you type.

See these Engagement Guidelines (https://clear.unt.edu/online-communication-tips) for more information.

Course Requirements

**In-Class Quizzes:** These grades will be based on in-class assignments or short quizzes, which may be given at any time during the class. Students must be present in class at the time the in-class activity is assigned in order to receive credit for the in-class activity. We will use iClicker Cloud and Canvas to deliver these quizzes. A missed in-class quiz may result in a grade of 0 for the missed quiz, although the lowest in-class quiz will be dropped.

**Homework:** Homework will be assigned based on material from the lectures and textbook. These assignments are meant for you to become familiar with the course material and this practice will aid you in mastering the concepts on the programming assignments and exams. No late homework will be accepted, so please make sure that you complete and submit all homework assignments on time.

**Discussions:** In discussion you will engage in discussing the on-going trends and future trends in wireless network domain. Each discussion will give you an opportunity to research and share your findings with your peers.

**Labs:** The labs are a smaller, individual course component that supplements larger lectures. Labs allow for hands-on, practical exposure to subject matter.

**Midterm Exams:** There may be one/two midterm examinations given in this course. The dates of these exams will be posted on Canvas and announced in class at least one week prior to the date of the exams. A make-up exam will be given at the discretion of the instructor when a student misses an exam with an excused absence. Unexcused absences on the date of an exam may result in a grade of 0 for the missed exam, so every effort should be made to attend class on the day of a scheduled exam.
**Final Exam:** There will be a final exam during the scheduled exam time on **MONDAY, May 06, 2024, from 4:00 PM to 6:00 PM.** All students are expected to take the final exam during the scheduled time period.

**Grading (tentative)**

Your course **grade** will be a **weighted** average according to the following:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-Class Quizzes</td>
<td>15.0%</td>
</tr>
<tr>
<td>Homework</td>
<td>15.0%</td>
</tr>
<tr>
<td>Labs</td>
<td>10.0%</td>
</tr>
<tr>
<td>Discussions</td>
<td>10.0%</td>
</tr>
<tr>
<td>Midterms</td>
<td>25.0%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Grades will be posted on Canvas throughout the semester to provide an ongoing assessment of student progress, though final assessment will be measured using the weighted average above. *Once a grade is posted on Canvas, students have two (2) weeks to dispute the grade, unless otherwise instructed.* The proper channel for grade disputes is to first go to the original grader (i.e., the TA) in an attempt to resolve the issue. If, however, a resolution cannot be reached between the student and the grader, the student shall then go to the instructor who will have the final say on the grade.

Students are responsible for submitting the **correct** assignments (i.e., uploading the proper files) for each applicable assignment submission on Canvas. In certain cases, when an assignment is submitted on time, but to an incorrect assignment location (e.g., submitting Homework 04 to Homework 05 drop box on Canvas), the assignment may be assessed a 30% reduction penalty if the due date has passed. If you have any questions or concerns about your submission, please work with your instructor, TA, or Peer Mentor to ensure the correct file(s) is/are submitted.

**Course Evaluation**

Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students the ability to confidentially provide constructive feedback to their instructor and department to improve the quality of student experiences in the course. SPOT evaluations should become available in April.

**Syllabus Change Policy**

This syllabus may be modified as the course progresses should the instructor deem it necessary. Notice of changes to the syllabus shall be made through Canvas and/or class announcement.

**UNT Policies**

**Academic Integrity Policy**

Academic Integrity Standards and Consequences. According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating,
fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

This course follows UNT’s policy for Student Academic Integrity that can be found at https://policy.unt.edu/policy/06-003 as well as the Cheating Policy for the Department of Computer Science and Engineering (posted on Canvas). Specifically, the first instance of a student found to have violated the academic integrity (i.e., cheating) policy will result in a grade of “F” for the course and have a report filed into the Academic Integrity Database, which may include additional sanctions.

Individual assignments must be the sole work of the individual student. For individual assignments, you should not work with other students on a shared solution or acquire a solution from the Internet. This includes sharing your solutions (i.e., for homework or programming assignments) that will be construed as cheating as well. If you are having trouble with an assignment, please consult with your instructor or TA. Failure to adhere to these strict standards may be cause for disciplinary action even leading to expulsion from the University.

In case the above description and in-class discussion of appropriate and inappropriate collaboration do not answer all of your questions, please meet with your instructor and look at the university Student Rights and Responsibilities web page.

NOTE: “Use of Artificial Intelligence (AI) to produce or help content without proper attribution or authorization, when an assignment does not explicitly call or allow for it, is plagiarism.”

ADA Policy
UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one’s specific course needs. Students may request accommodations at any time; however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website (https://disability.unt.edu/).

Prohibition of Discrimination, Harassment, and Retaliation (Policy 16.004)
The University of North Texas (UNT) prohibits discrimination and harassment because of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law in its application and admission processes; educational programs and activities; employment policies, procedures, and processes; and university facilities. The University takes active measures to prevent such conduct and investigates and takes remedial action when appropriate.

Emergency Notification & Procedures
UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills,
fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials.

Retention of Student Records
Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Canvas online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their individual record; however, information about student’s records will not be divulged to other individuals without proper written consent. Students are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University’s policy. See UNT Policy 10.10, Records Management and Retention for additional information.

Acceptable Student Behavior
Student behavior that interferes with an instructor’s ability to conduct a class or other students’ opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University’s expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT’s Code of Student Conduct (https://deanofstudents.unt.edu/conduct) to learn more.

Access to Information - Eagle Connect
Students’ access point for business and academic services at UNT is located at: my.unt.edu. All official communication from the University will be delivered to a student’s Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward e-mail Eagle Connect (https://it.unt.edu/eagleconnect).

Student Evaluation Administration Dates
Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during weeks 13, 14 and 15 of the long semesters to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no-reply@iasystem.org) with the survey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey, they will receive a confirmation email that the survey has been submitted. For additional information, please visit the SPOT website (http://spot.unt.edu/) or email spot@unt.edu.

Sexual Assault Prevention
UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT’s Survivor Advocates can assist a student who has been impacted by violence by filing protective
orders, completing crime victim’s compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565-2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759.

University of North Texas Compliance

To comply with immigration regulations, an F-1 visa holder within the United States may need to engage in an on-campus experiential component for this course. This component (which must be approved in advance by the instructor) can include activities such as taking an on-campus exam, participating in an on-campus lecture or lab activity, or other on-campus experience integral to the completion of this course.

If such an on-campus activity is required, it is the student’s responsibility to do the following:

(1) Submit a written request to the instructor for an on-campus experiential component within one week of the start of the course.

(2) Ensure that the activity on campus takes place and the instructor documents it in writing with a notice sent to the International Student and Scholar Services Office. ISSS has a form available that you may use for this purpose.

Because the decision may have serious immigration consequences, if an F-1 student is unsure about his or her need to participate in an on-campus experiential component for this course, s/he should contact the UNT International Student and Scholar Services Office (telephone 940-565-2195 or email internationaladvising@unt.edu) to get clarification before the one-week deadline.

Student Verification

UNT takes measures to protect the integrity of educational credentials awarded to students enrolled in distance education courses by verifying student identity, protecting student privacy, and notifying students of any special meeting times/locations or additional charges associated with student identity verification in distance education courses.

See UNT Policy 07-002 Student Identity Verification, Privacy, and Notification and Distance Education Courses (https://policy.unt.edu/policy/07-002).

Use of Student Work

A student owns the copyright for all work (e.g. software, photographs, reports, presentations, and email postings) he or she creates within a class and the University is not entitled to use any student work without the student’s permission unless all of the following criteria are met:

- The work is used only once.
- The work is not used in its entirety.
- Use of the work does not affect any potential profits from the work.
- The student is not identified.
- The work is identified as student work.
If the use of the work does not meet all of the above criteria, then the University office or department using the work must obtain the student’s written permission.

Download the UNT System Permission, Waiver and Release Form

**Transmission and Recording of Student Images in Electronically-Delivered Courses**

1. No permission is needed from a student for his or her image or voice to be transmitted live via videoconference or streaming media, but all students should be informed when courses are to be conducted using either method of delivery.

2. In the event an instructor records student presentations, he or she must obtain permission from the student using a signed release in order to use the recording for future classes in accordance with the Use of Student-Created Work guidelines above.

3. Instructors who video-record their class lectures with the intention of re-using some or all of recordings for future class offerings must notify students on the course syllabus if students' images may appear on video. Instructors are also advised to provide accommodation for students who do not wish to appear in class recordings.

   Example: This course employs lecture capture technology to record class sessions. Students may occasionally appear on video. The lecture recordings will be available to you for study purposes and may also be reused in future course offerings.

   No notification is needed if only audio and slide capture is used or if the video only records the instructor’s image. However, the instructor is encouraged to let students know the recordings will be available to them for study purposes.

**Academic Support & Student Services**

**Student Support Services**

**Mental Health**

UNT provides mental health resources to students to help ensure there are numerous outlets to turn to that wholeheartedly care for and are there for students in need, regardless of the nature of an issue or its severity. Listed below are several resources on campus that can support your academic success and mental well-being:

- [Student Health and Wellness Center](https://studentaffairs.unt.edu/student-health-and-wellness-center)
- [Counseling and Testing Services](https://studentaffairs.unt.edu/counseling-and-testing-services)
- [UNT Care Team](https://studentaffairs.unt.edu/care)
- [UNT Psychiatric Services](https://studentaffairs.unt.edu/student-health-and-wellness-center/services/psychiatry)
- [Individual Counseling](https://studentaffairs.unt.edu/counseling-and-testing-services/services/individual-counseling)