



CS 5183 Wireless and Mobile Networks

Credit Hours: THREE (3)
School of Computer Science
Gallogly College of Engineering

COURSE SYLLABUS

| | | | |
|------------------|---|-------------------------|-------------------|
| Instructor Name: | Shangqing Zhao | Semester/Term & Year: | Spring 2025 |
| Office Number: | DEH 210D | Class Meeting Days: | T/R |
| Phone Number: | 918-660-3292 | Class Meeting Time: | 1:30 PM – 2:45 PM |
| E-Mail: | shangqing@ou.edu | Class Meeting Location: | CEC 0441 |
| Discord: | https://discord.gg/92G8XMrUZ5 | Lab Meeting Location: | N/A |
| Office Hours: | T/R 12:30 PM – 1:30 PM | Delivery Method: | In-classroom |

TA: Mr. Yan He (heyang@ou.edu)
Office hour: 4:00 PM - 5:00 PM Friday on Discord

I. Welcome!

Welcome to the class! Today, wireless and mobile networks are deployed almost everywhere and have a wide range of applications around the world. In this class, we will be discussing technical designs in today's wireless networks to achieve performance and security.

II. Course Description

This course provides a systematic view of designing and securing wireless mobile computing systems and networks. It covers system and security elements from the physical layer all the way to the application layer in wireless mobile computing.

III. Course Prerequisites

Courses:

- Graduate standing
- CS 4133/5133 Data Networks;
- A statistics course from the departmentally approved list

Background: Basic probability knowledge and basic programming skills are essential to understand the technical content in this course. Students do not need to have the knowledge of wireless networking and cyber security to take this course. Prior knowledge of (wireless) communication theory is a bonus but not essential. The wireless and security content in the course is self-contained.

IV. Course Objective

This course is designed to provide a systematic view of wireless mobile networks and related security designs for students to understand today's wireless mobile systems and their security designs/vulnerabilities. The content of the course includes wireless communication channel properties with indications on security, wireless jamming attacks and its impact on communication/network performance, medium access control (MAC) layer design, vulnerabilities and exploits, network routing and malicious routing manipulation,

emerging mobile applications and Internet of Things as well as the security and privacy issues associated with them.

V. Course Topics

1. Wireless physical layer design
2. Wireless MAC layer design
3. Today's wireless mobile network and system design principles
4. Mobile computing applications and security issues

VI. Student Learning Outcomes

By the end of this course, students will be able to:

- a. describe the unique requirements to design a wireless mobile system or network;
- b. explain the methodology to design a new wireless mobile system or network;
- c. apply wireless protocols into existing real-world applications, and identify which protocols are more appropriate based the application demands;
- d. use security standards to analyze a wireless mobile system design and list potential vulnerabilities and security attacks that can exploit such vulnerabilities;
- e. identify the cost of security and balance a wireless system design between security and other factors, such as efficiency and performance.

VII. Required Texts and/or Readings and Course Materials

- There is no textbook requirement, but some reading will be required from the literature (journal articles, conference papers).
- The lecture notes will be posted on the course webpage after each lecture.

VIII. Supplementary (Optional) Texts and Materials

- Recommended readings: 1) "Mobile Communications (2nd Edition)," Jochen Schiller; and 2) "Ad Hoc Wireless Networks: Architectures and Protocols," C. Siva Ram Murthy and B.S. Manoj.

IX. Grading Scale

| Grading Scale (%) | |
|-------------------|---|
| 90 – 100 | A |
| 80 – 89 | B |
| 70 – 79 | C |
| 60 – 69 | D |
| 0 – 59 | F |

X. Grade Categories and Weights

| Assessment | Percent of Final Grade |
|-----------------|------------------------|
| Attendance | 5% |
| Assignments | 30% |
| Presentation | 10% |
| Group project | 10% |
| Midterm + Final | 20% + 25% |

XI. Grade Dissemination

Graded homework assignments will be returned individually in Canvas. You can access your scores at any time using "Grades" in Canvas.

XII. Course Schedule

* Note: The Schedule is subject to revision

| # | Topics |
|----|--|
| 1 | Course Overview and Introduction |
| 2 | Wireless Physical Layer I |
| 3 | Wireless Physical Layer II |
| 4 | Wireless MAC Layer Design I |
| 5 | Wireless MAC Layer Design II |
| 6 | Today's wireless mobile systems – PHY/MAC layer design I |
| 7 | Today's wireless mobile systems – PHY/MAC layer design II |
| 8 | Today's wireless mobile systems – PHY/MAC layer design III |
| 9 | Mobile Networking Systems and Security I |
| 12 | Mobile Networking Systems and Security II |
| 13 | Mobile Networking Systems and Security III |
| 14 | Mobile Application Layer Design and Security |

XIII. Course Policies: Grades

Late Work Policy:

Late homework/project submissions may be accepted at a penalty of 15% per day for no more than THREE days. There will be extra accommodation if you have been impacted by COVID-19, please let the instructor know.

Extra Credit Policy:

Homework/project assignments may have extra credit points, which can be given based on successful completion of the extra-credit tasks specified in the project assignment.

Rewrite Policy:

No rewrite is allowed in this course.

Make-up Exams Policy:

If a student cannot be present for an examination for a valid reason (validity to be determined by the instructor), a make-up exam will be given. Make-up exams are given at the convenience of the instructor.

Exam Retention Policy:

After exams are graded, the instructor will review the examination with the class and collect all exams. The exams will be retained for one year following the current one, and then they will be destroyed.

Group Work Policy:

Everyone must take part in a group project. All members of a group will receive the same score; that is, the project is assessed and everyone receives this score. However, that number is only 90% of your grade for this project. The final 10% is individual, and refers to your teamwork. Every person in the group will provide the instructor with a suggested grade for every other member of the group, and the instructor will assign a grade that is informed by those suggestions. Once formed, groups cannot be altered or switched, except for valid reasons.

Final Examinations Policy:

All final exams are to be scheduled in accordance with the University's final examination policy.

XIV. University Policies

Mental Health Support Services

Support is available for any student experiencing mental health issues that are impacting their academic success. Students can either be seen at the University Counseling Center (UCC) located on the second floor of Goddard Health Center or receive 24/7/365 crisis support from a licensed mental health provider through [TELUS Health](#). To schedule an appointment or receive more information about mental health resources at OU please call the UCC at 405-325-2911 or visit [University Counseling Center](#). The UCC is located at 620 Elm Ave., Room 201, Norman, OK 73019.

Title IX Resources and Reporting Requirement

The University of Oklahoma faculty are committed to creating a safe learning environment for all members of our community, free from gender and sex-based discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking, in accordance with Title IX. There are resources available to those impacted, including: speaking with someone confidentially about your options, medical attention, counseling, reporting, academic support, and safety plans. If you have (or someone you know has) experienced any form of sex or gender-based discrimination or violence and wish to speak with someone confidentially, please contact [OU Advocates](#) (available 24/7 at 405-615-0013) or [University Counseling Center](#) (M-F 8 a.m. to 5 p.m. at 405-325-2911)

Because the University of Oklahoma is committed to the safety of you and other students, and because of our Title IX obligations, I, as well as other faculty, Graduate Assistants, and Teaching Assistants, are mandatory reporters. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This includes disclosures that occur in: class discussion, writing assignments, discussion boards, emails and during Student/Office Hours. You may also choose to report directly to the Institutional Equity Office. After a report is filed, the Title IX Coordinator will reach out to provide resources, support, and information and the reported information will remain private. For more information regarding the University's Title IX Grievance procedures, reporting, or support measures, please visit [Institutional Equity Office](#) at 405-325-3546.

Reasonable Accommodation Policy

The University of Oklahoma (OU) is committed to the goal of achieving equal educational opportunity and full educational participation for students with disabilities. If you have already established reasonable accommodations with the Accessibility and Disability Resource Center (ADRC), please [submit your semester accommodation request through the ADRC](#) as soon as possible and contact me privately, so that we have adequate time to arrange your approved academic accommodations.

If you have not yet established services through ADRC, but have a documented disability and require accommodations, please complete [ADRC's pre-registration form](#) to begin the registration process. ADRC facilitates the interactive process that establishes reasonable accommodations for students at OU. For more information on ADRC registration procedures, please review their [Register with the ADRC](#) web page. You may also contact them at (405)325-3852 or adrc@ou.edu, or visit www.ou.edu/adrc for more information.

Note: disabilities may include, but are not limited to, mental health, chronic health, physical, vision, hearing, learning and attention disabilities, pregnancy-related. ADRC can also support students experiencing temporary medical conditions.

Religious Observance

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

[\[See Faculty Handbook 3.15.2\]](#)

Adjustments for Pregnancy/Childbirth Related Issues

Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact the Accessibility and Disability Resource Center at 405/325-3852 and/or the Institutional Equity Office at 405/325-3546 as soon as possible. Also, see the Institutional Equity Office [FAQ on Pregnant and Parenting Students' Rights](#) for answers to commonly asked questions.

Final Exam Period

Pre-finals week will be defined as the seven calendar days before the first day of finals. Faculty may cover new course material throughout this week. For specific provisions of the policy please refer to OU's [Final Exam Preparation Period policy](#).

Emergency Protocol

During an emergency, there are official university [procedures](#) that will maximize your safety.

Severe Weather: If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather.

1. Look for severe weather refuge location maps located inside most OU buildings near the entrances.
2. Seek refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building.
3. Go to the building's severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows.
4. Get in, Get Down, Cover Up
5. Wait for official notice to resume normal activities.

Additional [Weather Safety Information](#) is available through the Department of Campus Safety.

The University of Oklahoma Active Threat Guidance

The University of Oklahoma embraces a Run, Hide, Fight strategy for active threats on campus. This strategy is well known, widely accepted, and proven to save lives. To receive emergency campus alerts, be sure to update your contact information and preferences in the account settings section at one.ou.edu.

RUN: Running away from the threat is usually the best option. If it is safe to run, run as far away from the threat as possible. Call 911 when you are in a safe location and let them know from which OU campus you're calling from and location of active threat.

HIDE: If running is not practical, the next best option is to hide. Lock and barricade all doors; turn off all lights; turn down your phone's volume; search for improvised weapons; hide behind solid objects and walls; and hide yourself completely and stay quiet. Remain in place until law enforcement arrives. Be patient and remain hidden.

FIGHT: If you are unable to run or hide, the last best option is to fight. Have one or more improvised weapons with you and be prepared to attack. Attack them when they are least expecting it and hit them where it hurts most: the face (specifically eyes, nose, and ears), the throat, the diaphragm (solar plexus), and the groin.

Please save OUPD's contact information in your phone.

NORMAN campus: For non-emergencies call (405) 325-1717. For emergencies call (405) 325-1911 or dial 911.

TULSA campus: For non-emergencies call (918) 660-3900. For emergencies call (918) 660-3333 or dial 911.

Fire Alarm/General Emergency

If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates:

1. *LEAVE* the building. Do not use the elevators.
2. *KNOW* at least two building exits
3. *ASSIST* those that may need help
4. *PROCEED* to the emergency assembly area
5. *ONCE safely outside, NOTIFY first responders of anyone that may still be inside building due to mobility issues.*
6. *WAIT* for official notice before attempting to re-enter the building.

[OU Fire Safety on Campus](#)