

## **COURSE SYLLABUS**

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Instructor Name:	Shangqing Zhao	Semester/Term & Year:	Spring 2024
Office Number:	DEH 210D	Class Meeting Days:	M/W
Phone Number:	918-660-3292	Class Meeting Time:	3:00 PM – 4:15 PM
E-Mail:	shangqing@ou.edu	Class Meeting Location:	CEC 0121
Discord:	<a href="https://discord.gg/fP5yZfxmRU">https://discord.gg/fP5yZfxmRU</a>	Lab Meeting Location:	N/A
Office Hours:	M/W 4:15PM – 5:15 PM	Delivery Method:	In-classroom

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### **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:

- CS 4133/5133 Data Networks;
- MATH 4743 Introduction to Mathematical Statistics, or MATH G4753 Applied Statistical Methods, or ISE 3293 Applied Engineering Statistics, or ECE 2523 Probability, Statistics and Random Processes

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	40%
Presentation	10%
Group project	10%
Midterm + Final	15% + 20%

**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

This section includes the mandatory University policies.

#### OU Masking Protocols – Norman Campus

General Facilities and Classrooms – Masking is welcome on the OU Norman campus. People may choose to mask at any time or for any purpose.

In classroom settings, there is no longer a 2-week masking requirement when there is a reported positive case of COVID-19 in the class.

Health Care Facilities – Masking is required for all individuals in patient-facing settings, including clinical research participant areas and facilities where patient care is a primary function.

OU Health Sciences Center programs will coordinate masking requirements with hospital and clinic partners, as appropriate.

### **Recommended Masks – OU Norman Campus**

If you choose to wear a mask, you are encouraged to wear a disposable surgical mask or a KN-95. Your mask should fit well and cover your nose and mouth.

Masking Protocols: OU-Tulsa and Health Sciences Center

OU-Tulsa and HSC are to follow the COVID-19 protocols for those specific campuses.

### **Social Distancing**

The university continues to strongly recommend social distancing in patient care and clinical research participant settings.

### **Copyright Syllabus Statement for In-Person or Online Courses**

Sessions of this course may be recorded or live-streamed. These recordings are the intellectual property of the individual faculty member and may not be shared or reproduced without the explicit, written consent of the faculty member. In addition, privacy rights of others such as students, guest lecturers, and providers of copyrighted material displayed in the recording may be of concern. Students may not share any course recordings with individuals not enrolled in the class, or upload them to any other online environment.

### **Academic Integrity**

Cheating is strictly prohibited at the University of Oklahoma, because it devalues the degree you are working hard to get. As a member of the OU community it is your responsibility to protect your educational investment by knowing and following the rules. For specific definitions on what constitutes cheating, review the Student's Guide to Academic Integrity at

[http://integrity.ou.edu/students\\_guide.html](http://integrity.ou.edu/students_guide.html)

To be successful in this class, all work on exams and quizzes must be yours and yours alone. You may not receive outside help. On examinations and quizzes you will never be permitted to use your notes, textbooks, calculators, or any other study aids. Should you see someone else engaging in this behavior, I encourage you to report it to myself or directly to the Office of Academic Integrity Programs. That student is devaluing not only their degree, but yours, too. Be aware that it is my professional obligation to report academic misconduct, which I will not hesitate to do. Sanctions for academic misconduct can include expulsion from the University and an F in this course, so don't cheat. It's simply not worth it.

### **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.

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

### **Reasonable Accommodation Policy**

Students requiring academic accommodation should contact the Accessibility and Disability Resource Center for assistance at (405) 325-3852 or TDD: (405) 325-4173. For more information, please visit <http://www.ou.edu/drc/home.html>. Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

#### **Title IX Resources and Reporting Requirement**

For any concerns regarding gender-based discrimination, sexual harassment, sexual assault, dating/domestic violence, or stalking, the University offers a variety of resources. To learn more or to report an incident, please contact the Sexual Misconduct Office at 405/325-2215 (8 to 5, M-F) or [smo@ou.edu](mailto:smo@ou.edu). Incidents can also be reported confidentially to OU Advocates at 405/615-0013 (phones are answered 24 hours a day, 7 days a week). Also, please be advised that a professor/GA/TA is required to report instances of sexual harassment, sexual assault, or discrimination to the Sexual Misconduct Office. Inquiries regarding non-discrimination policies can be directed to University Equal Opportunity Officer and Title IX Coordinator at 405/325-3546 or [smo@ou.edu](mailto:smo@ou.edu). For more information, visit <http://www.ou.edu/eoo.html>.

#### **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 your professor or the Disability Resource Center at 405/325-3852 as soon as possible. Also, see <http://www.ou.edu/eoo/faqs/pregnancy-faqs.html> for answers to commonly asked questions.

#### **Final Exam Preparation 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 (<https://apps.hr.ou.edu/FacultyHandbook#4.10>).

#### **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.

[Link to Severe Weather Refuge Areas](#) , [Severe Weather Preparedness - Video](#)

#### **Armed Subject/Campus Intruder**

If you receive an OU Alert to shelter-in-place due to an active shooter or armed intruder situation or you hear what you perceive to be gunshots:

1. GET OUT: If you believe you can get out of the area WITHOUT encountering the armed individual, move quickly towards the nearest building exit, move away from the building, and call 911. 2. HIDE OUT: If you cannot flee, move to an area that can be locked or barricaded, turn off lights, silence devices, spread out, and formulate a plan of attack if the shooter enters the room. 3. TAKE OUT: As a last resort fight to defend yourself.

For more information, visit <http://www.ou.edu/emergencypreparedness.html>

[Shots Fired on Campus Procedure - Video](#)

#### **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](#)

#### **Mental Health Support Services**

If you are experiencing any mental health issues that are impacting your academic performance, counseling is available at the University Counseling Center (UCC). The Center is located on the second floor of the Goddard Health Center, at 620 Elm Rm. 201, Norman, OK 73019. To schedule an appointment call (405) 325-2911.

For more information please visit <http://www.ou.edu/ucc>.

*\*Every part of this syllabus is subject to adjustment as the semester progresses. If you are dissatisfied with the course policies, grading, and assignments, please contact the instructor. Reasonable requests for modifications may be accommodated at the instructor's discretion.*