

# CS 4173/5173 Computer Security

## Spring 2026 Syllabus

### 1. Instructor

Dr. Shangqing Zhao ([shangqing@ou.edu](mailto:shangqing@ou.edu))

Class meetings: T&R 3:00 PM to 4:15 PM in Dale Hall 0103

Office hour: T&R 4:15 PM to 5:15 PM in DEH 210D

### 2. Teaching Assistant

Ms. Yu Cai ([Yu.Cai-1@ou.edu](mailto:Yu.Cai-1@ou.edu))

Office hour: 12:30 PM - 2:30 PM Tuesday in DEH 115

Course Discord server: <https://discord.gg/k8UjxJqJMN>

### 3. Prerequisites

Course: CS 3113 Introduction to Operating Systems

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 prior knowledge of cyber security. The knowledge of computer and network systems is a bonus but not an essence. The technical/mathematical content in the course is self-contained.

### 4. Course Description

This course provides an overall view and essential knowledge of computer security, and it is not heavily theory-oriented, but application-oriented with appropriate mathematical content. It is self-contained and covers basic elements in communication, network and data security, including information-theoretic security, cryptographic primitives, secret sharing, basic security attacks and countermeasures.

Note: The content and syllabus are subject to adjustment during the semester. Part of the materials used in this course will be based on existing lectures from other universities. No student may earn credit for both CS 4173 and CS 5173.

### 5. Course Objectives

This course provides essential knowledge for students to understand concepts and mechanisms in computer and network security. It not only helps you understand and solve real-life security problems, but also helps you improve your own practices when handling your personal information or data in computer and network systems.

### 6. Course Topics

1. Security goals and metrics
2. Symmetric and asymmetric ciphers
3. Secure architectures and protocols

4. Common attacks and countermeasures

## 7. Student Learning Outcomes

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

1. describe the basic security objectives associated with a particular design/application
2. use security standards to analyze a system design
3. apply cryptographic primitives to design a secure system
4. list potential vulnerabilities of a given system that may be potentially exploited
5. identify key factors associated with building a cost-efficiency security design based on cryptographic ciphers

## 8. Recommended Textbook

Charlie Kaufman, Radia Perlman, and Mike Speciner, *Network Security: Private Communication in a Public World, 2nd Edition*, Prentice Hall, 2002, ISBN: 0-13-0460192.

Wenliang Du. *Computer & Internet Security: A Hands-on, 2nd Edition*, 2019.

Note: The lecture slides/notes will be posted on the course webpage (Canvas) after each lecture.

## 9. Course Schedule

(These will be adjusted based on the actual progress in a semester.)

#	Topics
1	Course Overview and Introduction
2	Security Objectives and Requirements
3	Cryptography and Security Metrics
4	Symmetric Cryptography
5	Hash Functions
6	Basic Number Theory and Public Cryptography
7	Digital Certificates and PKI
8	Authentication Protocol Design
9	Homomorphic Encryption and Honey Encryption
10	Blockchain and Proof of Work
11	Secure Data Applications
12	Anonymous Network and Online Privacy

## 10. Grading Scale

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

## 11. Grade Categories and Weights

	CS 4173	CS5173
Attendance	5%	5%
Assignments	30%	20%
Midterm Exam	25%	25%
Final Exam	30%	30%
Final Project	10%	10%
Paper Presentation	0%	10%

## 12. Policies on Late Assignments

For each day an assignment is late - up to a maximum of 3 days, the grade is reduced 15%. For example, if you submit a 90%-correct assignment 2 days late, your overall assignment score will be 60%. There will be extra accommodation if you have been impacted by COVID-19, please let the instructor know.

## 13. Policies on Absences and Scheduling Makeup Work

There will be no makeups for homework assignments. Make-up exams will not normally be permitted. Exceptions will be made if a student presents a police report or a doctor's note that shows some emergency.

## 14. Student Evaluations

The College of Engineering utilizes student ratings as one of the bases for evaluating the teaching effectiveness of each of its faculty members. The results of these forms are important data used in the process of awarding tenure, making promotions, and giving salary increases. In addition, the faculty uses these forms to improve their own teaching effectiveness. The original request for the use of these forms came from students, and it is students who eventually benefit most from their use. Please take this task seriously and respond as honestly and precisely as possible, both to the machine-scored items and to the open-ended questions.

## 15. University Policies

This section includes the mandatory University policies.

### Generative AI Policy

I hope that this course aids you in a creative exploration of Generative AI tools and how they can be used to assist you in accomplishing the goals of this course. In this course, you:

- Should never use any AI tools for **in-class quizzes**, violation will lead to 0 quiz score.
- May use any **free** Generative AI tools for **assignments and project**, such as Copilot, or any Open LLMs. This will allow everyone in the course to have the **same access** to Generative AI. You **should not fully delegate** the code writing to AI. It is better to just use the autocompletion features of AI.
- You **MUST** cite your usage of Generative AI, including the version/date of AI models, any direct quotes or paraphrasing of ideas/content generated by AI, per our class's citation guidelines.

- **Must** provide a statement at the end of the assignment about your Generative AI usage. This statement should be created without the use of Generative AI and should be your own reflection. This statement must include: the platform(s) and prompt(s) you used, a summary of how Generative AI helped you achieve the learning objectives of the course associated with this assignment, and what additional work you did to verify the output, and to make the work your own.

To implement this policy, we will have ongoing discussions in class about effective use of Generative AI and how you are using it. You'll be asked to reflect frequently about AI usage both in-class and as part of your assignment submission (see assignment instructions for specifics), where you may also be asked to share your prompts, screenshots of your chats with Generative AI tools, and how you used Generative AI to prepare you to, by the end of the semester, independently (without the use of Generative AI) achieve the learning objectives of this course.

- If you have any questions about this policy, please talk with me.
- Consequences for Violating the Generative AI Usage Policy: Deviating from the acknowledgement, citation, and reflection guidelines described here may be considered a violation of the academic integrity policy of this course. Per our usage policy, you will be responsible for accuracy, including appropriately citing and summarizing any articles you find through AI research tools, and thus must read the material you are citing. Submitting data or research that is not real (a risk when overly relying on Generative AI) may result in an academic integrity violation for falsifying information. Additionally, there may be times, such as in-class quizzes, specially constrained assignments, where Generative AI usage is prohibited. Any use of AI in those cases will be considered a violation of the academic integrity policy.
- My Use of Generative AI: I will model appropriate Generative AI usage by clearly disclosing when I use it and why. Expected use cases include: revising quiz or exam questions and responses (with my oversight), drafting case studies or educational games to help connect our course topics to the real-world, using my notes and previous PowerPoints to improve the structure of my lectures so that they are clearer to you all as students, graphic design, revising assignment instructions and rubrics to improve clarity for students, receiving feedback on how I communicate with students, and using AI research tools to find current articles to update our course readings. I will never use Generative AI to grade your work.

### **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](mailto:adrc@ou.edu), or visit [www.ou.edu/adrc](http://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 and Related Issues**

Should you need modifications or adjustments to your course requirements because of pregnancy or a pregnancy-related condition, please request modifications via the [Institutional Equity Office](#) website or call 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 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](#).

## **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](http://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\*](#)