



Reliable and Secure Systems

Course Description

Today, systems software runs on billions of devices across the globe, powering personal devices, cloud data centers, industrial machines, and healthcare equipment. As society becomes increasingly reliant on digital infrastructure, ensuring that computer systems are reliable and secure has become more important than ever.

This course focuses on understanding key challenges in building reliable and secure systems, and examines modern techniques to address them. Through reading and discussing research papers, as well as working on hands-on projects, students will learn how to analyze systems problems and explore ways to improve system reliability and security.

Course Information

Time:	Tuesday, Thursday 12:30 - 1:45 PM
Location:	Sitterson Hall 284
Department:	Computer Science
Website:	COMP 790-199
Schedule:	See course Schedule

Instructor Information

Name:	Sishuai Gong
Office:	Sitterson Hall 352
Email:	sishuai@cs.unc.edu
Office hours:	Tuesday, Thursday 1:45 - 2:45 PM

Target Audience

This course is intended for graduate students interested in software systems—including operating systems and distributed systems—or research in building reliable and secure systems.



Prerequisites

COMP 530/730 (operating systems), COMP 734 (distributed systems), or equivalent background.

Course Requirements

- Paper reading – Complete assigned readings before class.
- In-Class Presentation & Discussion – Present and critically evaluate selected papers.
- Semester-Long Project – Conduct original work that improves the reliability or security of a modern system.

Course Goals & Student Learning Outcomes (SLOs)

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

- Explain the challenges of making modern systems reliable and secure.
- Summarize and critically evaluate state-of-the-art research addressing these challenges.
- Apply systems techniques in a hands-on project to improve reliability and security in practice.

Course materials

Required readings will be drawn from the research papers listed in the course schedule.

Recommended supplemental readings include:

- [How to Read a Paper](#), S. Keshav
- [Why Do Computers Stop and What Can Be Done About It?](#), Jim Gray
- [How Complex Systems Fail](#), Richard I. Cook

Grading Scheme and Scale

- Paper presentation: 30%
- Class participation: 30%
- Research project: 40%

Grades will be assigned according to the following scale.

- H \geq 90



- $P \geq 75$
- $L \geq 60$
- $F < 60$

Policy Statements

University Attendance Policy

University Policy: As stated in the University's [Class Attendance Policy](#), no right or privilege exists that permits a student to be absent from any class meetings, except for these University Approved Absences:

1. Authorized University activities: [University Approved Absence Office \(UAAO\)](#) website provides information and [FAQs for students](#) and [FAQs for faculty](#) related to University Approved Absences
2. Disability/religious observance/pregnancy/short-term military service, as required by law and approved by the [University Compliance Office](#), or in the case of short-term military service, the Dean of Students
3. Significant health condition and/or personal/family emergency as approved by the [Office of the Dean of Students](#), [Gender Violence Service Coordinators](#), and/or the [University Compliance Office](#).

Code of Conduct

All students are expected to adhere to University policy and follow the guidelines of the UNC Student Code of Conduct. Additional information can be found at <https://studentconduct.unc.edu/>.

Artificial Intelligence (AI) Use Policy

Carolina students are expected to follow these AI guidelines:

1. AI should help you think, not think for you. You may be able to use these tools to brainstorm ideas, research topics, and analyze problems, but you must decide what's appropriate and accurate.
2. Engage responsibly with AI. You must evaluate AI-generated outputs for potential biases, limitations, inaccuracies, false output, and ethical implications. Do not put personal or confidential data into these tools.



3. The use of AI must be open and documented. You should declare, explain, and cite any use of AI in the creation of your work using applicable standards (e.g., APA, MLA, course guidelines). Understand that you are ultimately 100% responsible for your final product.
4. Follow specific AI guidelines in this syllabus. If you are unsure, check with me. Guidance offered in this syllabus would be referenced should an issue be referred to Student Conduct for alleged academic misconduct.

Syllabus Changes

The instructor reserves the right to make changes to the syllabus including project due dates and test dates. These changes will be announced as early as possible.

Services and Student Support Statements

University Compliance Office (formerly Equal Opportunity and Compliance) - Accommodations

University Compliance Office (UCO) Accommodations Team ([Accommodations – UNC Equal Opportunity and Compliance](#)) receives requests for accommodations for disability, pregnancy and related conditions, and sincerely held religious beliefs and practices through the University's Policy on Accommodations. UCO Accommodations team determines eligibility and reasonable accommodations consistent with state and federal laws.

Counseling & Psychological Services (CAPS)

UNC-Chapel Hill is strongly committed to addressing the mental health needs of a diverse student body. The [Heels Care Network](#) website is a place to access the many mental health resources at Carolina. CAPS is the primary mental health provider for students, offering timely access to consultation and connection to clinically appropriate services. Go to the [CAPS website](#) or visit their facilities on the third floor of the Campus Health building for an initial evaluation to learn more. Students can also call CAPS 24/7 at 919-966-3658 for immediate assistance.



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Title IX Resources

Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made [online to the UCO](#) or by contacting the University's Title IX Coordinator, Elizabeth Hall, or the Report and Response Managers in the University Compliance Office (UCO) (formerly the Equal Opportunity and Compliance Office). Please note that I am designated as a Responsible Employee, which means I must report to the UCO any information I receive about the forms of misconduct listed in this paragraph. If you'd like to speak with a confidential resource, those include Counseling and Psychological Services, the University's Ombuds Office, and the Gender Violence Services Coordinators. Additional resources are available at safe.unc.edu.