Computer and Network Security

COMP-5370/-6370
Fall 2024 Syllabus
Date: August 19, 2024

Tues/Thur 3:30 – 4:45pm CT
Location: Shelby 2101
Website: comp5370.org

TA:	Ginny Genge	Instructor:	Dr. Springall
Phone:	N/A	Phone	334-844-6660
Office Hours:	Mon, 1–2 CT	Office Hours:	Mon, 3–4pm CT
	Wed, 4–5 CT		We, 3–4pm CT
	Brown-Koppel 2168		3101H Shelby
Email (b64):	dmdnMDAwM0BhdWJ1cm4uZWR1	Email (b64):	YWFzcHJpbmdAYXVidXJuLmVkdQ==

Catalog Description

Fundamentals of computer security. Access Control. Authentication. Digital signatures and watermarks. Modeling and performance assessment. Viruses and worms. Identification of avenues for compromising systems.

Required Textbook

None

Course Outcomes

Students should be able to:

- Identify, apply, and justify the use of basic cryptographic primitives, schemes, and protocols in pursuit of security and privacy related goals
- Understand and intelligently discuss common offensive and defensive practices and techniques related to computer and network security
- Understand and intelligently discuss the common security and privacy failures found in real-world applications, services, and systems as well as their canonical solutions
- Analyze and evaluate real-world security and privacy issues and their associated trade-offs

Topics Covered

(incomplete list)

- Cryptography and Other Security Concepts
  - Attackers, Incentives, Threat Modeling
  - Hashes, Message Integrity, Secure Channels
  - Randomness, Symmetric/Asymmetric Algorithms, Authentication

- Application Security
  - Viruses, Malware, Ransomware
  - Binary Exploitation, Control-Flow Hijacking
  - Security Hardware, Hardware Security, Isolation Techniques
- Network and Internet Security
  - Firewalls, Scanning, IDS/IPS
  - TLS, CA Ecosystem, Network Partitioning
  - HTTP/HTTPS, XSS, CSRF
- Real-World Security
  - Corporate Surveillance and Abuse
  - E2E, Tor, Decoy Routing
  - Government Interference and Cyber-Conflict
  - Government Surveillance and Abuse

Ethics, Law, and University Policies

To effectively contribute to the security and privacy community as well as protect systems, networks, and information, it is vital to be able to think like an attacker and approach situations from their viewpoint. At times, this includes understanding and practicing techniques that can be used to compromise systems, networks, and information in the real-world and outside of controlled situations, this may violate the law, university policy, and commonly accepted ethical standards (among others). Under some circumstances, probing for weaknesses may result in severe penalties up to and including expulsion, civil fines, and jail time.

This course's policy is that you must respect the privacy and property rights of others at all times otherwise **you will fail this course**. Acting lawfully and ethically is each student's responsibility. It is highly recommended that students carefully read the Computer Fraud and Abuse Act (CFAA) [link] which is one of many federal statutes that broadly criminalizes security-related activities.

Grading

- **3x Course Projects (each)** — 10%
- **Final Exam** — 25%
- **2x In-Class Exams (each)** — 12.5%
- **Midterm Exam** — 20%

Calculating Your Course Grade With your returned scores as a percentile value (i.e. 0% – 100%), fill-in the below formula:

$$0.10 \times project_1 + 0.10 \times project_2 + 0.10 \times project_3 + 0.125 \times exam_1 + 0.125 \times exam_2 + 0.20 \times midterm + 0.25 \times final$$

Errors in Submission Students should be aware that all projects will be graded in an auto-grader style workflow (i.e. automated and/or mechanical actions to test submission). If a compilation/interpretation error is encountered (i.e. syntax error, tabs vs. spaces in Python, etc.) the submitted source code **will not** be examined nor debugged and **a grade of zero (0) will be given**. The environment in which your projects will be graded will be clearly defined in each assignment and non-running projects will be eligible for a regrade as discussed below.

Partial Credit Effort will be made to award partial credit but it is the students responsibility to submit assignments/exams where partial credit is not necessary.

Regrade Requests While obvious grading errors* can be handled immediately by bringing them the instructor's attention, students are welcome to request an assignment/project/exam be regraded in its entirety by contacting the TA. All regrade requests must follow the requirements of:

1. Clearly state that a regrade is being requested.
2. Clearly state the fundamental misunderstanding that caused the original submission to be deducted points.
3. Clearly state the changes that were made to remediate that fundamental misunderstanding.
4. Contain no extraneous changes that are not related to that fundamental misunderstanding.
5. Be made within seven (7) days of the assignment being returned.
6. Be requested over email.

Students should be aware that points will be deducted based on the original submission's fundamental misunderstanding and depending on the circumstances, this may result in a grade of zero (0). The instructor has the final authority on A) whether a regrade will be conducted based on the request and B) to what degree the fundamental misunderstanding will be penalized.

Attendance Attendance is not required nor taken but in-person students are *highly encouraged* to attend regularly and participate in in-class discussions. Although slides will be posted after-class, recordings will not be made available to non-distance learning students unless an Absence Memorandum is provided by Engineering Student Services. Distance students have the option to attend in-person as much or little as they like but are obviously not required to. If a situation arises due to space limitations, in-person students will receive priority for in-room seating.

Late Assignments Any assignment submitted after the deadline must be sent via e-mail to the TA. Late assignments will lose 10 percentage points per hour† based on the timestamp in the email received. **"Late-days" are not available to students in the Fall 2024 iteration of this course.** In the case of extenuating circumstances, the student *must* contact the instructor at the earliest reasonable opportunity. The Excused Absence policy will be applied but exceptions may be made at the instructor's discretion.

Grade Mappings

A	90–100
B	80–89
C	70–79
D	60–69
F	0–59

*Examples: $2+2=5$ or "circled B, B is the correct answer, points were deducted for B"

†-10 percentage points whether 1 second or 59 minutes and 59 seconds late

Course Policies (all formats)

Any and all university, college, and department policies are applicable.

Contacting the Instructor

In addition to the predictably available periods (office hours and post-lecture), students are welcome to call (334-844-6660), stop-by the office (3101H Shelby), or stop him in the hallway at any time. The instructor is usually on-campus between late-morning and late-night (i.e. "hacker hours") and though not always available for long-form discussions, short questions can often be answered immediately and a near-term time can be setup to talk more (i.e. "come back in 20 minutes", "call back at 4", etc."). Although students can email the instructor if desired, this is the *least favored* communications channel and most emails will be either A) responded to during the next lecture period (if potentially of interest to other students) or B) redirected to the next-available office hours.

ADA

The instructor will make all reasonable accommodations to comply with the provisions of the Americans with Disabilities Act. Students can submit their university-approved accommodations through AU Access and to make an individual appointment with the instructor as soon as possible during the first week of classes. Students who have not established accommodations through the Office of Accessibility but need accommodations should make an appointment soon as possible with the Office of Accessibility, 1228 Haley Center, 844-2096.

Academic Honesty

All portions of the Auburn University Student Academic Honesty Code found in the Student Policy eHandbook apply to this class. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee. In such events, the instructor may delay referral and notification of such to the end of the course.

You may discuss assignments with classmates. However, you are individually responsible for solving all assignments, including writing your own code. You are not allowed to view nor copy code or problem solutions from anyone. You **may not** use others' code (including open-source libraries/examples) unless it is *explicitly approved by the instructor in-writing*.

Excused Absences

For all excused absences, you must first obtain an Absence Memorandum from Engineering Student Services per the AU Policy on Class Attendance. You should contact the instructor directly for other absences and at the earliest possible opportunity.

Contingency Plan for Contingency Plans

In the event that any currently unrequired contingency plans become required, this contingency plan identifies that the contingency plan for that case is to define a contingency plan as required.

Course Policies (In-Person)

In-Class Makeup Exams

A missed midterm/final exam *requires* an excused absence as discussed above. The student must contact the instructor within 48 hours from the time that the exam was given or the exam grade will remain zero. The makeup schedule is determined by the instructor and will be at the earliest available opportunity.

Course Policies (Distance-Learning)

Proctored Exams Distance Learning students will take exams through the use of an in-person proctor within a 48 hour window of when they are given in-class. Proctors must be identified by each student at least 72 hours before the start of the exam window but use of a formal proctoring service **is not required**. The proposed proctor can be any person in a position to fairly administer the exam such as a manager, someone in HR, a local librarian, etc. but **may not** be a family member, friend, employee, peer, etc.. The proctor *is not required to have any experience or knowledge about computer science or security-world* as proctors are only there to make sure the rules are followed and the exam is completed fairly.

Online Office Hours Due to the unpredictability of students' schedules, time-zones, and other commitments, there are no standing online office hours. Students are free to contact the instructor directly and at any time if a meeting is desired. The instructor is happy to meet via VTC or over the phone and will make every effort to schedule such a meeting as soon as possible. Based on past semesters, the instructor is often able to meet briefly (10–15 minutes) the same-day if not immediately (usually late-afternoon/early-evening CT-time).

Errata

(none)