Computer and Information Security

CIS 5370
Class Periods: MWF Period 3 (9:35 AM - 10:25 AM)
Location: WM0100
Academic Term: Spring 2024

Instructor:
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Office Hours: Monday, 11:00 AM -12:00 PM (MH 4133)

Teaching Assistant:
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Office Hours: Tuesday, 12:00 PM to 1:00 PM

Course Description
Computer security is one of the most exciting and challenging areas in all of computer science. Many of the world's largest technology companies have made securing their computer systems one of their largest concerns. While technology has changed, the fundamental problems of securing computer systems have stayed remarkable similar.

This course provides an in-depth examination of issues in computer security, and assumes prior knowledge of fundamental security concepts. We will be studying research in securing computer and operating systems, with a focus on the design of authorization systems and a thorough examination of concepts, past and present, that continue to be influential in secure systems design.

Course Pre-Requisites / Co-Requisites
None. A strong background in OS is recommended.

Course Objectives
Successful students will have learned foundational concepts of topics will include protection systems, basic security principles, classic approaches to system security, system vulnerabilities, mandatory access controls in research and commercial operating systems, capability systems, virtual machines and security kernels, and distributed systems security. Selected seminal and current papers in the field will also aid in providing context and further understanding of the area.

Materials and Supply Fees
None.

Required Textbooks and Software
We will make extensive use of the textbook required for the course:

Trent Jaeger, Operating System Security, 1/E, Morgan and Claypool, 2008. This is available both as hard copy from the bookstore and electronically as a PDF through the UF library.

Course material will also be drawn from influential papers in the field.

Recommended Materials
- Bruce Schneier, "The Security Mindset":
  https://www.schneier.com/blog/archives/2008/03/the_security_mi_1.html
- S. Keshav, "How to Read a Paper":
  https://web.stanford.edu/class/ee384m/Handouts/HowtoReadPaper.pdf
- "The Mayfield Handbook of Technical and Scientific Writing": http://www.mit.edu/course/21/21.guide/

Course Schedule
Might change depending on time constraints and external events. Canvas will be used for announcements.

Week 1:	Introduction to System security fundamental concepts
Week 2:	Principles of security and protection
Week 3:	Principles of access control
Week 4	Threats in commercial operating systems
Week 5:	Design of secure systems
Week 6:	Integrity models
Week 7:	Kernel security
Week 8:	Secure UNIX variant
Week 9:	Multics
Week 10:	Spring break (no class)
Week 11:	Virtualization
Week 12:	Microkernel Security
Week 13:	Android and Peripheral Security
Week 14:	Cloud Security
Week 15:	Microarchitecture Security and emerging topics

Quizzes, Assignments & Project
Quizzes will be used to evaluate the student's knowledge regarding the topics covered in class. Quizzes will be announced in class and handled through the E-learning platform.

The **assignments** will be written essays and coding tasks. Students are expected to have done the reading before class, submit the assignments on time. The assignments will be announced in class and handled through the UF E-Learning platform.

The **final group project** will consist of writing a conference-style paper. Project topics will be chosen from a provided list and discussed through email or during meetings outside of class with the instructor. While time is constrained, there should be real thought and effort exhibited by the work. The project grade will be based on novelty, correctness, depth of understanding, clarity of presentation, and effort. More information about the project will be given during class. Do not delay: quarters are very short and in order to be able to perform any interesting work, the sooner a topic is chosen, the better the end-result will be.

Attendance Policy, Class Expectations, and Make-Up Policy
The expectations for the course are that students will attend every class, do the readings assigned for class, and actively and constructively participate in class discussions. Students will be called upon to present some of the material for the class. **Due to the course format, students who miss many lectures will be at a significant disadvantage.**

The class lectures will be available in synchronous remote modality via Zoom (HyFlex) and available on the UF E-Learning platform after each lecture (Disclaimer: Recordings are made by the zoom platform and it is not guarantee the quality or availability of the recording. To ensure that you view the complete lecture, attend the live lecture session.)

Notice: The lectures will be audio-visually recorded for students in the course to reference after the live recorded session. Students who choose to participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. A textual "chat" feature is also available during lectures and it will be also recorded. Please note, since the lecture is in a public setting, chat messages may or may not be answerable during the live lecture.

Late submissions for quizzes and assignments will have ten points deducted per day (rounded up for partial days) after the due date until the submission is closed. After closing, no work will be accepted (and the grade will be 0).

There are no makeup for missed midterms and final project submission (and the grade will be 0). Excused absences for a legitimate reason (e.g., medical or travel for university approved events), must be in compliance with university policies and require appropriate documentation a **few days ahead** of the exam date. Later justifications will not get accepted. Emergency situations should be notified to the instructor or the TA **before** the start of the exam.

If the student is not able to submit the assignments or quizzes, students should contact the instructor and provide valid justification a **few days ahead** of the assignment due date. Later justifications will not get accepted. Emergency situations should be notified to the instructor or the TA **before** the start of the class.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Assignments	100 each	20%
Quizzes	100 each	10%
2 Midterms	100 each	30%
Final Project	100	40%
		100%

Grading Policy
(Might change. Canvas will be used for announcements.)

Percent	Grade	Grade Points
92.0 - 100.0	A	4.00
85.0 - 91.9	A-	3.67
78.0 - 84.9	B+	3.33
71.0 – 77.9	B	3.00
64.0 - 70.9	B-	2.67
57.0 - 63.9	C+	2.33
50.0 – 56.9	C	2.00
43.0 - 49.9	C-	1.67
36.0 - 42.9	D+	1.33
29.0 - 35.9	D	1.00
22.0 - 28.9	D-	0.67
0 - 21.9	E	0.00

More information on UF grading policy may be found at:
UF Graduate Catalog
Grades and Grading Policies

Academic Integrity
Students are required to follow the university guidelines on academic conduct and the student honor code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code) at all times. Students failing to meet these standards will be reported to the Dean of Students, which can result in the student receiving an 'E' for the

course. In particular, students are explicitly forbidden from copying anything off of the Internet (e.g., source code, text, slides, ChatGPT) without proper attribution or citation. Students are also forbidden from copying code/answers from each other for the purposes of completing any assignment/quiz.

Ethics Statement
This course covers topics concerning the security of many systems that are widely deployed and potentially critical. Unethical use of the above technologies includes the circumvention of existing security or privacy measurements for any purpose, or the dissemination, promotion, or exploitation of vulnerabilities of these services.

The students must respect the privacy and property rights of others at all times, or else will result in **failing the course**. The students must carefully read the Computer Fraud and Abuse Act (CFAA): https://www.nacdl.org/Landing/ComputerFraudandAbuseAct. This is one of several laws that govern "hacking." It is student responsibility to understand what applicable law prohibits.

The course is **NOT** a class on hacking. Any activity outside of the spirit of these guidelines will be reported to the proper authorities both within and outside of UF and may result in dismissal from the class and the University. Exceptions to these guidelines may occur in the process of reporting vulnerabilities through the proper channels; however, students with any doubt should consult the instructor for advice. **DO NOT** conduct any action which could be perceived as technology misuse anywhere or under any circumstances.

As members of the university, students must review the university's policy on Responsible Use of Information Resources for guidelines concerning proper use of information technology at UF, as well as the UF Honor Pledge.

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons),

including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Program Coordinator
• HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:
Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing

staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.edu.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints*: https://distance.ufl.edu/getting-help/; https://distance.ufl.edu/state-authorization-status/#student-complaint.*