CIS5370 - Computer and Information Security

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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 indepth 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. 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.

A detailed list of lecture by lecture contents, assignments, and due dates (subject to change as the term evolves) will be available in the Course Summary table below. Clicking individual lecture links in the table will bring up the corresponding entries in the **Canvas Calendar** with additional details.

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.

Please contact the instructor if you have questions regarding the material or concerns about whether your background is suitable for the course.

Course Expectations

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. There will be class assignments, occasional quizzes, and examinations. There will also be a major research project in security, with the chief product being a conference-style paper. Project topics will be discussed in class and may be proposed through email or during meetings outside of class with Prof. Butler. 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.

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.

The tentative grading policy is as follows:

20% Assignments

10% Quizzes

15% Midterm Exam (March 3, 2023)

15% Midterm 2 Exam (April 26, 2023)

40% Project

Quizzes will be assigned sporadically throughout the term and test comprehension of the reading material as well as topics covered during lectures. Missing a quiz without an extremely sound reason will result in a zero for it.

The ability to comprehend the material and the papers read will be essential towards passing the course.

Academic Integrity Policy

Students are required to follow the university guidelines on academic conduct at all times. Students failing to meet these standards will automatically receive a 'F' grade for the course. The instructor carefully monitors for instances of offenses such as plagiarism and illegal collaboration, so it is very important that students use their best possible judgement in meeting this policy. The instructor will not entertain any discussion on the discovery of an offense, and will assign the 'F' grade and refer the student to the appropriate University bodies for possible further action.

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/policies/student-honor-code-student-conduct-code/)** **(https://sccr.dso.ufl.edu/policies/student-honor-code-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.

Note that students are explicitly forbidden to copy anything off the Internet (e.g., source code, text) for the purposes of completing an assignment or the final project without discussion with the instructor. Also, students are forbidden from discussing or collaborating on any assignment except were explicitly allowed in writing by the instructor.

Ethics Statement

This course considers topics involving personal and public privacy and security. As part of this investigation we will cover technologies whose abuse may infringe on the rights of others. As an instructor, I rely on the ethical use of these technologies. Unethical use may include circumvention of existing security or privacy measurements for any purpose, or the dissemination, promotion, or exploitation of vulnerabilities of these services. Exceptions to these guidelines *may* occur in the process of reporting vulnerabilities through public and authoritative channels. Any activity outside the letter or spirit of these guidelines will be reported to the proper authorities and may result in dismissal from the class and possible more severe academic and legal sanctions.

When in doubt, please contact the course professor for advice. **Do not** undertake any action which could be perceived as technology misuse anywhere and/or under any circumstances unless you have received explicit permission from Professor Butler.

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, **https://www.dso.ufl.edu/drc (https://www.dso.ufl.edu/drc)**) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at **https://evaluations.ufl.edu/evals (https://evaluations.ufl.edu/evals)** . Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at **https://evaluations.ufl.edu/results/ (https://evaluations.ufl.edu/results/)** .

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

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
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu

- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, **taylor@eng.ufl.edu (mailto:taylor@eng.ufl.edu)**
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, **nishida@eng.ufl.edu (mailto: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 (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: http://www.counseling.ufl.edu/cwc (Links to an external site.), 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 (Links to an external site.), 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/ (http://www.police.ufl.edu/)** .

Academic Resources

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

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/ (Links to an external site.).

Library Support, http://cms.uflib.ufl.edu/ask (Links to an external site.). 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/ (Links to an external site.).

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/ (Links to an external site.).

On-Line Students Complaints: http://www.distance.ufl.edu/student-complaint-process (Links to an external site.).

Course Summary:

Date	Details	Due
Mon Jan 9, 2023	**Lecture: Course Introduction (https://ufl.instructure.com/calendar?event_id=2690700&include_contexts=course_473356)**	9:35am to 10:25am
Wed Jan 11, 2023	**Assignment 1: Paper summaries (https://ufl.instructure.com/courses/473356/assignments/5548038)**	due by 9am
	Lecture: Research Papers/Security Goals (https://ufl.instructure.com/calendar?event_id=2690708&include_contexts=course_473356)	9:35am to 10:25am

Date	Details	D
Fri Jan 13, 2023	Lecture: Security Principles (https://ufl.instructure.com/calendar?event_id=2690729&include_contexts=course_473356)	9:35am to 10:25am
	Assignment 2: Student Profile (https://ufl.instructure.com/courses/473356/assignments/5491478)	due by 5pm
Mon Jan 16, 2023	Lecture: The Reference Monitor Concept (https://ufl.instructure.com/calendar?event_id=2690704&include_contexts=course_473356)	9:35am to 10:25am
	Assignment 2.5 - Virtual machine installation (https://ufl.instructure.com/courses/473356/assignments/5491477)	due by 11:59pm
Wed Jan 18, 2023	Lecture: Security in Commercial Operating Systems (https://ufl.instructure.com/calendar?event_id=2690713&include_contexts=course_473356)	9:35am to 10:25am
Fri Jan 20, 2023	Lecture: OS Defenses (https://ufl.instructure.com/calendar?event_id=2690715&include_contexts=course_473356)	9:35am to 10:25am
Mon Jan 23, 2023	Lecture: Commercial OS Security Fixes (https://ufl.instructure.com/calendar?event_id=2690714&include_contexts=course_473356)	9:35am to 10:25am
Wed Jan 25, 2023	Lecture: ROP/Name Resolution and Access Control Policy (https://ufl.instructure.com/calendar?event_id=2690705&include_contexts=course_473356)	12:50pm to 1:40pm
Fri Jan 27, 2023	Lecture: Permissions and Confinement (https://ufl.instructure.com/calendar?event_id=2690716&include_contexts=course_473356)	9:35am to 10:25am

Date	Details	D
Mon Jan 30, 2023	Lecture: The Multics Operating System (https://ufl.instructure.com/calendar?event_id=2690702&include_contexts=course_473356)	9:35am to 10:25am
	Project Choice (https://ufl.instructure.com/courses/473356/assignments/5491484)	due by 11:59pm
Wed Feb 1, 2023	Lecture: Multics Security Evaluation (https://ufl.instructure.com/calendar?event_id=2690712&include_contexts=course_473356)	9:35am to 10:25am
Fri Feb 3, 2023	Lecture: Linux Security Modules (https://ufl.instructure.com/calendar?event_id=2690703&include_contexts=course_473356)	9:35am to 10:25am
Sat Feb 4, 2023	Assignment 3: Buffer Overflows (https://ufl.instructure.com/courses/473356/assignments/5491479)	due by 5:59am
Mon Feb 6, 2023	Lecture: LSM and Security-Enhanced Linux (https://ufl.instructure.com/calendar?event_id=2690717&include_contexts=course_473356)	9:35am to 10:25am
Wed Feb 8, 2023	Lecture; SELinux Policies (https://ufl.instructure.com/calendar?event_id=2690727&include_contexts=course_473356)	9:35am to 10:25am
Fri Feb 10, 2023	Lecture: Project Proposal and Related Work (https://ufl.instructure.com/calendar?event_id=2690725&include_contexts=course_473356)	9:35am to 10:25am
Mon Feb 13, 2023	Lecture: Access Control (https://ufl.instructure.com/calendar?event_id=2690718&include_contexts=course_473356)	12:50pm to 1:40pm
Wed Feb 15, 2023	Lecture: Access Control Models (https://ufl.instructure.com/calendar?event_id=2690709&include_contexts=course_473356)	12:50pm to 1:40pm

Date	Details	D
Fri Feb 17, 2023	Lecture: Advanced Access Control Models (https://ufl.instructure.com/calendar?event_id=2691752&include_contexts=course_473356)	9:35am to 10:25am
Sat Feb 18, 2023	Assignment 4: LOMAC (https://ufl.instructure.com/courses/473356/assignments/5491480)	due by 6:59am
Mon Feb 20, 2023	Lecture: Security Kernels (https://ufl.instructure.com/calendar?event_id=2690710&include_contexts=course_473356)	1:50pm to 2:40pm
Wed Feb 22, 2023	Lecture: Trustworthy Computing (https://ufl.instructure.com/calendar?event_id=2690701&include_contexts=course_473356)	1:50pm to 2:40pm
Fri Feb 24, 2023	Lecture: Integrity Measurement (https://ufl.instructure.com/calendar?event_id=2690726&include_contexts=course_473356)	1:50pm to 2:40pm
	Detailed Project Proposal (https://ufl.instructure.com/courses/473356/assignments/5491481)	due by 5:59pm
Mon Feb 27, 2023	Lecture: Trusted Execution Environments (https://ufl.instructure.com/calendar?event_id=2690707&include_contexts=course_473356)	1:50pm to 3:40pm
Wed Mar 1, 2023	Lecture: Mid-Term Review (https://ufl.instructure.com/calendar?event_id=2691754&include_contexts=course_473356)	9:35am to 10:25am
Fri Mar 3, 2023	Midterm Exam 1 (https://ufl.instructure.com/courses/473356/assignments/5491487)	due by 11:59pm
Tue Mar 14, 2023	NO CLASS: take-home midterm (https://ufl.instructure.com/calendar?event_id=2690730&include_contexts=course_473356)	1:50pm to 2:40pm
Thu Mar 16, 2023	Lecture: SGX (https://ufl.instructure.com/calendar?	1:50pm to 3:30pm

Date	Details	D
	event_id=2690697&include_contexts=course_473356)	
Tue Mar 21, 2023	Lecture: SGX (https://ufl.instructure.com/calendar?event_id=2690698&include_contexts=course_473356)	1:50pm to 2:40pm
Thu Mar 23, 2023	Lecture: Virtualization Security (https://ufl.instructure.com/calendar?event_id=2690722&include_contexts=course_473356)	12:50pm to 1:40pm
Tue Mar 28, 2023	Lecture: VM and Container Security (https://ufl.instructure.com/calendar?event_id=2690731&include_contexts=course_473356)	1:50pm to 2:40pm
Thu Mar 30, 2023	Lecture: Separation Kernels and Virtual Machine Security (https://ufl.instructure.com/calendar?event_id=2690719&include_contexts=course_473356)	12:50pm to 1:40pm
Fri Mar 31, 2023	Project Update due (https://ufl.instructure.com/courses/473356/assignments/5491486)	due by 6:59pm
Tue Apr 4, 2023	Lecture: Secure Virtualization (https://ufl.instructure.com/calendar?event_id=2690706&include_contexts=course_473356)	12am
Thu Apr 6, 2023	Lecture: Microkernel Security (https://ufl.instructure.com/calendar?event_id=2690720&include_contexts=course_473356)	1:50pm to 3:30pm
Tue Apr 11, 2023	Lecture: Peripheral Security (https://ufl.instructure.com/calendar?event_id=2690724&include_contexts=course_473356)	1:50pm to 2:40pm
Thu Apr 13, 2023	Cloud Computing Security (https://ufl.instructure.com/calendar?event_id=2690699&include_contexts=course_473356)	12:50pm to 1:40pm
Mon Apr 17, 2023	Lecture: Cloud Operating Systems (https://ufl.instructure.com/calendar?event_id=2690723&include_contexts=course_473356)	12:50pm to 1:40pm

Date	Details	D
Fri Apr 21, 2023	Lecture: Capability Architectures (https://ufl.instructure.com/calendar?event_id=2690711&include_contexts=course_473356)	12:50pm to 1:40pm
Mon Apr 24, 2023	Lecture: Term Summary (https://ufl.instructure.com/calendar?event_id=2691755&include_contexts=course_473356)	12am
Wed Apr 26, 2023	Midterm Exam 2 (https://ufl.instructure.com/courses/473356/assignments/5491482)	due by 11:59pm
Fri Apr 28, 2023	Lecture: Final Project Q&A (https://ufl.instructure.com/calendar?event_id=2691756&include_contexts=course_473356)	9:35am to 10:25am
Tue May 2, 2023	Final Project (https://ufl.instructure.com/courses/473356/assignments/5491483)	due by 11:59pm