

# Computer and Information Security

CIS 4360 (CISE)

**Class Periods:** T (01:55-02:45 PM) (Period 7)  
R (01:55-03:50 PM) (Period 7-8)

**Locations:** T (CSE E121)  
R (CSE A101)

**Academic Term:** Spring 2022

## **Instructor:**

**Prof. Sara Rampazzi** - [srampazzi \(at\) ufl \(dot\) edu](mailto:srampazzi@ufl.edu)

Office Hours: TUE (3:00-4:00 pm) online or by email appointment

## **Teaching Assistant:**

**TBD**

Office Hours: TBD

## **Course Description**

Total Credit: 3.

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 made significant inroads in many areas of society, the challenges of keeping systems and networks secure have broad implications for not just users of technology, but all citizens.

## **Course Pre-Requisites / Co-Requisites**

COP 4600 (Operating Systems) or equivalent, programming experience necessary (e.g., C++, Python)

## **Course Objectives**

This course provides an introduction to computer security. Students successfully completing this class will be able to evaluate works in academic and commercial security and gain expertise in fundamental topic areas. The course begins with a tutorial of the basic elements of cryptography and continues by supplementing readings in computer security with seminal papers and monographs in a wide range of security areas.

Topics covered include network security, authentication, security protocol design and analysis, security modeling, key management, intrusion detection, DDOS detection and mitigation, biometrics, web security, privacy, anonymity and other emerging topics.

## **Materials and Supply Fees**

None.

## **Required Textbooks and Software**

Most of the course readings will come from textbooks and a few seminal papers in the field. Links to these materials (subject to change as the term evolves) will be provided on the course pages. In addition, slides and links to critical reference materials will also be provided after each lesson. We will draw heavily from the following textbook:

- Paul van Oorschot, Computer Security and the Internet: Tools and Jewels, Springer, 2021.  
<https://www.springer.com/gp/book/9783030336486> The 2020 edition is similar, so it can be used as well.

Note that while the book should be available in the bookstore if you want a hard copy, you can also find a PDF copy of the book on Prof. van Oorschot's website at <https://people.scs.carleton.ca/~paulv/toolsjewels.html>  
Please respect the restrictions on use noted on the web page.

## **Recommended Materials**

If you are not familiar with C or Python and UNIX programming environments, you will need to become so. Having some exposure to reading assembly may be helpful. There are many good free online references for C and Python. For additional resources, the following are recommended for learning and using C:

- Kernighan and Ritchie, *The C Programming Language*. 2/E, Prentice Hall, 1988.
- Harrison and Steele, *C: A Reference Manual*
- A.D. Marshall, *Programming in C* (<https://users.cs.cf.ac.uk/Dave.Marshall/C/>)  
<https://www.cprogramming.com/>

The following is a good resource on Python programming:

- *Python Programming Fundamentals*: <https://pythonprogramming.net/python-fundamental-tutorials/>  
<https://www.learnpython.org/>

The following are good resources on UNIX programming:

- Stevens and Rago, *Advanced Programming in the Unix Environment*. 2/E, Addison Wesley, 2005.
- Kerrisk, *The Linux Programming Interface*. 1/E, No Starch Press, 2010.

If you are unfamiliar with using the command line, the following resource is helpful:

- <https://linuxcommand.org/>

You likely learned some assembly in a computer organization or architecture course. Reading x86 assembly is not tremendously different from MIPS assembly. If you want a short primer, the x86 Assembly Guide from the University of Virginia is good (<http://www.cs.virginia.edu/~evans/cs216/guides/x86.html>). For a canonical reference, *The Art of Assembly Language* is excellent.

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

## **Course Schedule**

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

Week 1:	Introduction to Computer security fundamental concepts
Week 2:	Threat modeling and typical attacks
Week 3:	Cryptographic Building Blocks
Week 4:	Public Key Cryptography
Week 5:	Private Key Cryptography
Week 6:	Digital Signatures and Key Agreement
Week 7:	Passwords and Authentication
Week 8:	Authentication Protocols
Week 9:	Preparation for midterm
Week 10:	Spring break (no class)
Week 11:	Web Security
Week 12:	Access Control Protocols
Week 13:	Software Security
Week 14:	Malwares
Week 15:	Network-Based Attacks

**Attendance Policy, Class Expectations, and Make-Up Policy**

**Attendance is not mandatory. The class will be available in synchronous remote modality via Zoom (HyFlex).**

Students are encouraged to use their laptops to follow the material. Lectures will be recorded and will be available on the UF E-Learning platform after each lecture. The expectations for the course are that students will do the readings and homework assigned for class, and actively and constructively participate in class discussions. There will be class assignments, occasional quizzes, and examinations.

The course will include one midterm and one final exam. Students will be responsible for material covered in the lectures. There are no makeups for missed or late submission assignments.

**Late submissions:** Late submissions will have -10 points deducted plus one point deducted for day (rounded up for partial days) after the due date until the assignment closes. After closing, no work will be accepted.

**You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.** If you are sick, stay home and self-quarantine. Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators. See updated information under the “Health and Wellness” section and visiting the website: <https://coronavirus.ufl.edu/> If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on-campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.

Excused absences must in compliance with university policies and require appropriate documentation. If the student is not able to submit the assignments for a legitimate reason (e.g., medical or travel), students should contact the instructor and provide justification a few days ahead of the assignment due date.

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
Homework	100 each	50%
Midterm	100	20%
Final Exam	100	30%

**Grading Policy**

(Might change)

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
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More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### ***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.ua.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.ua.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.

### ***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) without proper attribution or citation.

### ***Ethics Statement***

This course covers topics concerning the security of many systems that are widely deployed and potentially critical. As part of this course, we will investigate methods, tools and techniques whose use may negatively impact the rights, property and lives of others. As security professionals, we rely upon the ethical use of the above

technologies to perform research. However, it is easy to use such tools in an unethical manner. Unethical use includes the circumvention of existing security or privacy measurements for any purpose, or the dissemination, promotion, or exploitation of vulnerabilities of these services.

The policy of this course is that you must respect the privacy and property rights of others at all times, or else you will **fail the course**. Acting lawfully and ethically is your responsibility. 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 your responsibility to understand what applicable law prohibits.

This 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 Professor Rampazzi for advice. **DO NOT** conduct any action which could be perceived as technology misuse anywhere or under any circumstances unless you have received explicit permission from Professor Rampazzi.

Please 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. As members of the university, you are required to abide by these policies.

### ***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 Conduct 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. 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 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
- Jennifer Nappo, Director of Human Resources, 352-392-0904, [jpennacc@ufl.edu](mailto:jpennacc@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>

## **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](mailto: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](mailto: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/>.

#### **COVID-19**

- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email [covid@shcc.ufl.edu](mailto:covid@shcc.ufl.edu)) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the [UF Health Screen, Test & Protect website](#) for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

### Academic Resources

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

**Career Resource 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:** <http://www.distance.ufl.edu/student-complaint-process>.